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THE
HYGIENIC TREATMENT
OF
CONSUMPTION
AND
CONSUMPTIVE TENDENCIES.

THE
HYGIENIC TREATMENT
OF
CONSUMPTION
AND
CONSUMPTIVE TENDENCIES

*Part 1.—Nature and Cause of the Disease. Part 2.—Prevention
and Treatment in its Earlier Stages. Part 3.—Treatment
in more Advanced Stages.*



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P R E F A C E.

THIS work was written to advocate the treatment of consumption by hygienic remedies, which are accessible to all who have the intelligence and the wisdom to acquire a knowledge of them and their application. Most important of these remedies is the enlargement of the chest and the lungs, both as preventive and curative measures in the early stages of the disease. The extent to which this is possible by suitable methods is far greater than is generally known; particularly is this the case in early life when growth is more certain, and even in later years much can be accomplished. In many cases I have known a growth of four, five, and even six inches in chest measurement, and an imperfect chest converted into a very fine one, and the person lifted above and out of all danger from consumption, except under the most adverse circumstances.

In addition the author has put great importance upon pure air and light, particularly on sun-bathing and vocal culture, to which several chapters with methods

are devoted. Food, clothing, the dwelling, horseback riding, the will and will power, and many other psychical agencies too generally neglected are fully discussed. The resting in the open air at various seasons of the year is described, and its advantages for those with little physical strength demonstrated.

This work was commenced more than twenty years ago, and would have been given to the world a year earlier but for the great interest felt at that time in Professor Koeh's methods, which the author believed false in principle, and which have already met their fate.

It is written mainly for the patient, as the author believes he can, under most circumstances, do most for himself, and also be better able to co-operate with his physician at the same time.

The patient will not suppose that he is to use all of the remedies given in this work, but only such as are more especially adapted to his needs, bearing always in mind that all excesses in treatment are to be avoided.

No mention has been made of medicines, as at most little benefit can be derived from them, and a reliance on their supposed virtues is sure to attract the patient from the remedies here recommended.

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PART I.

NATURE AND CAUSES OF THE DISEASE.

THE
HYGIENIC TREATMENT
OF
CONSUMPTION AND CONSUMPTIVE
TENDENCIES.

CHAPTER I.

THE DISEASE.

MANY diseases afflict the human race, but none are more to be dreaded than consumption of the lungs, or *phthisis pulmonalis*, and for many reasons.

1. It is to be dreaded on account of its frequency and great fatality.

2. It is to be dreaded on account of the protracted suffering it causes, and the painful anxiety of friends who are often powerless to help. The weakness is a distressing feature, the coughing is hard to bear, and often racks the debilitated organism almost beyond endurance.

The difficulty of full and perfect respiration produces what may, perhaps not inappropriately, be termed a continuous partial suffocation or deprivation of air, so necessary to life and health.

3. It is a disease which, in most cases, unfits the victim for the duties of life, except in a minor degree. If it occurs early, the person can never with propriety marry, or become the parent of children, for they might inherit a weak or defective organism, with a tendency to the same disease, and be a perpetual care if they survive infancy and childhood.

4. It is a disease causing much expense, which, in a majority of cases, patients can ill afford to bear. The loss of strength prevents them from engaging in remunerative labour, and so they must be supported by others. Medical fees, medicines, better food and constant care, and, perhaps, travel or residence in a foreign land must be provided, often out of a purse not well filled.

5. It is an insidious disease, almost always becoming firmly established before the patient and friends are willing to admit that it is anything more than a cold, a disease of the throat, or some trivial derangement of the respiratory passages, which will soon pass away.

6. It is without doubt contagious, and there is danger of conveying it to others, perhaps to those the patient loves and would on no account harm, or perhaps to strangers whom he has never seen and has no right to injure.

7. It is a disease most difficult to cure. Only now and then, in the past, has one once in its embrace escaped; and even in more recent times, although it is beginning to yield to improved methods of treatment, the best of which are known to be only partially successful in a small number of cases.

These are some, but not all of the reasons why consumption is a disease to be dreaded, and I may add, much more to be dreaded than even small-pox or cholera. The latter are indeed terrible, but they are less frequent, of shorter duration, and far less fatal than the former, and cause much less suffering.

The word, *consumption*, is from the Latin, and signifies to consume, or waste away, and although the same word is with equal propriety applied to other diseases and bodily conditions, yet it is so appropriate to this disease, that it is by common consent used to designate it.

It is a disease in which there is a gradual wasting away of both the living matter of the

body, its fat, and the bodily strength and power to perform labour and resist unfavourable conditions.

The term, *phthisis*, another name for consumption, is from the Greek, and has the same meaning: to waste away, to decay, to decline.

Sometimes the word, *tuberculosis*, is used to designate the same disease, because tubercles are always formed when it is present; the word, *tuberculosis*, of course, being derived from the word, tubercle.

The real nature of consumption has only recently been known. It is very true that Lænnec, as long ago as 1819, in his philosophical and classical work on the chest, did much to give the world a correct knowledge of its character, and the direction which he gave to its study has been the basis of much that has, in later years, been done. Since the publication of his work, the term, *phthisis pulmonalis*, has been used only to denominate a disease of the lungs in which there are the particular morbid productions known as tubercles. Previous to his time, the term, consumption, included several affections of the lungs and throat, largely catarrhal in their nature, such as bronchitis, chronic pneumonia, a chronic cough of any kind, laryngeal catarrh, &c.

The word tubercle is used, without qualification, to denote the nodules of granular cells that constitute the lesion of tuberculosis, or consumption, although other kinds of tubercles are recognised. It first becomes visible to the naked eye as a very small grey nodule, as hard as cartilage. Slowly it increases in size, and, at the same time, undergoes degeneration, changes from grey to yellow, and finally breaks down into a thick, curdy mass, leaving an ulcerous cavity where there was at first a tumour. If these ulcerous cavities could be cleansed and disinfected, as an external ulcer can be, the disease could no doubt be more easily cured; but they are inaccessible, and the broken-down matter remains for a longer or shorter time, and is itself a further source of contagion to the healthy parts of the lungs.

Examination with the microscope of this broken-down matter reveals abundant pus corpuscles, epithelia, and portions of the elastic connective tissue fibres, which give to the lungs their great elasticity. These ulcerous cavities, like a boil, continue to discharge matter, which finds its way into the air passages and is finally coughed up.

The cavities also enlarge, extend into other

cavities, and soon the substance of the lungs is so far destroyed as to render them unfit for performing the functions of respiration, when the patient dies.

Lænnec's views on the nature of consumption continued to prevail for half a century, when Niemeyer and others advanced the theory that the disease had its origin, in a majority of cases, in inflammatory processes preceding the formation of tubercle, the existence of which was not denied.

And now we have at last the discovery by Koch of a micro-organism, a bacillus of the tubercle, which can be isolated, cultivated outside of the body, and introduced artificially into the bodies of animals, reproducing the same disease in them.

According to this view, consumption or tuberculosis is (1) an infectious disease characterised by the formation of tubercles or tuberculous matter, and produced by the *bacillus tuberculosis*; and (2) the local process in scrofulous affections, in which there is an exudation of matter nutritive or pathological in character, which develops into cells, these tuberculisng or undergoing tubercular metamorphosis. (Virchow.) This, of course, implies the entrance or

latent presence somewhere in the body of the specific bacilli. Just how, when and where they are introduced is not yet fully known.

Among its varieties are acute miliary tuberculosis, anthracotic tuberculosis, avian tuberculosis, bovine tuberculosis, latent tuberculosis, pulmonary tuberculosis, genital tuberculosis, &c. Also in the mouth, skin and intestines the same processes may occur; in fact, wherever the bacilli enter or lodge, *e.g.*, in the brain, as in tubercular meningitis, or in the peritoneum. Illness results (1) from the poisonous excretion of the bacillus, which upsets bodily functions and nutrition; (2) from inflammation and blockade due to the poison, and the presence of the tubercles, respectively; (3) from loss of working lung or intestinal surface; and (4) from suppuration of dying tubercular tissue.

CHAPTER II.

THE CAUSES OF CONSUMPTION.

IT is a law of the universe that there are and must always be causes for all results. If during a rain storm the water leaks through the roofs of our houses we know there is a reason for it in an imperfection of the structure ; and if we wish to prevent it, we make such repairs as are necessary. If a good farmer finds his crops defective, he seeks a cause for it either in an exhausted soil, an unpropitious season, the ravages of insects, or slothful methods of culture ; and if he is wise he removes these causes so far as lies within his power, and substitutes other and better conditions. If he cannot do this, he will fail in his occupation. The same principle applies to all vocations, and it naturally becomes an important part of life's work to seek for causes and, if necessary, to remove them.

And what is a cause ? We may define it as

that which makes anything begin to be. The cause or causes exist before there can be any effect. Brown, in his philosophical work, says : "A cause, in the fullest definition which it admits, may be said to be that which immediately precedes any change, and which, existing at any time, in similar circumstances, has been always, and will be always, immediately followed by a similar change." Aristotle, in his metaphysics, divides causes into four kinds : first, the material ; second, the formal ; third, the efficient, and, fourth, the final cause. And he explains each in this way : The marble is the material cause or the statue ; the idea of the sculptor is its formal cause ; the efficient cause is the principle of change or motion which actually produces the thing, as the labour of the artist with his tools ; and the final cause is that for the sake of which the statue is made, as, for instance, the memory of the hero to whom it is dedicated.

All things have their causes, even the will, which is generally believed to be free.

In medicine, authors have gone to unnecessary extremes in defining causes as relating to disease, and we have a long list of different kinds, of which I may mention the following :

1. The accessory causes, which have only a secondary influence in producing disease.

2. The accidental causes, which act only in certain conditions, and do not always produce the same result, as cold which may at one time cause bronchitis and at another time pneumonia or rheumatism.

3. External causes, as foul air or cold, raw, moist winds, which affect us from without.

4. Internal causes, which arise within the body, as our passions and emotions.

5. Hidden causes, or those we cannot find out.

6. Mechanical causes, as in pressure on any organ.

7. Negative causes, as when there has been privation from food.

8. Predisposing causes, or those conditions of the body which tend to certain diseases.

9. Exciting causes, or those conditions which actually produce them.

All these classifications are more or less arbitrary, and although they may have a certain use, I shall, in considering the causes of consumption, speak mainly of the predisposing and the exciting ones.

The predisposing causes of consumption are those bodily and mental conditions which render

one liable to the disease whenever the exciting causes are present with sufficient force. They are the remote causes, those which may be inherited from ancestors, and which often lie dormant during a large portion, or perhaps all, of the individual's life. They do not actually cause the disease; they only render it easy for the disease to become real when the true causes are present. If a diamond merchant keeps his diamonds in a poor safe, with a badly constructed lock, and exposed to thieves, they may be stolen. These conditions are the predisposing causes of the theft. But if there are no thieves around, or if they do not know of the treasures in the safe, the man's goods will be as secure as if they were guarded in the most perfect manner. The thieves are the actual, the exciting cause of the theft. Without them, the predisposing causes, the carelessness, the insufficient guarding, might exist forever without evil results.

And what are those bodily and mental conditions which predispose to consumption? They are a constitution not sufficiently guarded against noxious influences; a weakly, scrofulous constitution, one in which there is a poverty of blood, a deficiency of healthy living matter, digestive

organs that do their work poorly, or are not able to digest an abundance of wholesome food. There is also usually a narrow chest and small lungs. The heart may be weak, the nervous system not strong, often irritable. In other words, the constitution is not made of iron, and its powers of resistance are not equal to the demands that are likely to be made upon it. This predisposition may be inherited, as when the sins of the fathers are visited upon the children; or it may be acquired by over-exertion, by insufficient food, exhausting diseases, or by excesses of any kind which drain life's forces faster than they can be restored. These are some of the predisposing causes of the disease. They may not all exist in the same person, or to the same extent; but some of them will be present in a majority of cases.

Now and then we meet with a case of consumption in which none of these conditions appear to have existed. In such a one we are quite sure that the exciting causes have been present with more than usual force.

The exciting causes are those which most immediately concern us, though this ought not to be the case, for if the predisposing causes were well understood by parents, physicians and sani-

tarians, the disease could be prevented, by removing as far as possible the conditions favouring it and by fortifying the constitution through those methods which I shall consider later.

One of the most frequent of all the exciting causes of consumption is a cold upon the lungs. This has been so regarded from time immemorial. A consumptive usually takes cold easily. The slightest exposure may produce one. Dr. B. W. Richardson, for many years connected with a London hospital for consumptives, and under whose observation many thousands of cases have passed, says : " But we who have observed the phenomena of the commencement of phthisis pulmonalis are aware that the common excitant of the first symptoms is catarrh, or common cold, contracted usually when the body is exhausted from over-work, from anxiety, from fatigue or other depressing influences." The same thoughtful observer also adds : " I can scarcely recall a case in which the origin of the disease was not from a cold ; and the eminent physician of our time, Sir Thomas Watson, once expressed to me, when we were meeting in consultation in a case of acute tuberculosis, brought on by an exposure to a severe chill, that there was no observation in medicine of which he was so assured as that of the

development of phthisical disease in the predisposed from taking what in other persons would be simply called a cold."

I presume this is the experience and the observation of nearly every one who has paid much attention to the subject. One case I will recall of a marked character. It was a young lady of eighteen who was in apparently good health, but, attending a ball one night in July, she danced excessively until almost dawn, became overheated and greatly exhausted; then she went to a window and stood in the draught for many minutes, took a severe cold, and never was well a day after it, but soon developed consumption, and died not many months later.

Another exciting or immediate cause of consumption is confinement in close, foul, unventilated rooms, either at labour or while sleeping. Air, or the oxygen of the air, is a food for man as much as bread, and without an abundance of it we become starved; besides, the confined air breathed over and over again becomes loaded with a peculiar and most deadly poison, which has a very depressing effect on the body, and especially upon the nervous system and on the lungs. The effects of confined air as a cause of consumption have been observed among the

Indians, who are not subject to this disease when living naturally in their out-of-door life; but bring them into close contact with civilisation, confine them indoors, as is sometimes done in schools, and they become consumptive as quickly, or even more so, as the white man. The evil effects of an air confined and contaminated by the crowding of many persons into a small space, and the production of consumption from it, has been observed among the negroes of the West India Islands, who often sleep huddled together as thickly as they can be in these unventilated places.

We have equally bad effects upon shop girls who toil many hours daily in the devitalised air of shops and stores, where there is little sunshine, and among whom there is little opportunity or inclination for preventing the evils of this kind of life by out-door exercises and sport when the labour of the day is over.

The general impression has for a long time also prevailed that labour in cotton factories was especially productive of consumption. The dust and fibres which are so abundantly and constantly present in the air seem to irritate the bronchial passages, and by slow degrees lead to the development of this disease. There is no doubt but

the bad hygienic condition of the worker, the poor diet, the excessive perspiration caused by some of the processes, and the ease with which he takes cold, all contribute to this end, as does working in some metals, especially the grinding of needles, knives, and the cutting of stones. That much of the injury might be avoided by hygienic conditions there is no doubt; but the classes who engage in such work are usually those who have no knowledge of hygiene, or desire to guard themselves from injury. They do not seem to have any pride in bodily perfection, any ambition to keep all their powers of body and of mind in a high condition, requisites of the first importance to those who would live sanitary, wholesome lives, and leave strong, healthy descendants.

There are some occupations, from the position the workers are obliged to assume, that promote the development of this disease, as bookkeeping and all other vocations which cramp the chest and give it little play. On the other hand, there are some kinds of labour which develop and strengthen the chest and diminish the risks of acquiring this disease.

There are a few diseases which are frequently followed by consumption, and may be said to cause it. One of them is measles, when not

properly treated, or when the sufferer is careless, and heedless of exposure before he has fully recovered. So frequently has this happened that the disease has come to be more dreaded in the cold season of the year than at any other time. Were it not for the precaution which is taken on account of this fear, no doubt the number of cases of measles terminating in consumption would be greatly increased. Whooping-cough is another disease which sometimes leads to the same end. Epidemic influenza, or la grippe, has also caused many to become consumptive. The weakened condition in which it leaves the air passages, especially of the delicate and infirm, allows an easy entrance to the germs of the disease. To this may be added any other causes which produce great exhaustion and a weakening of the body, as fevers, catarrh of the stomach, and excessive motherhood. If there is a slumbering tendency to phthisis the too frequent bearing of children is quite certain to develop it. The early marriage of an anæmic person, one who is pale and bloodless, and her subjection to the strains and cares of family life and the rearing of young has sent many a woman to the grave who might otherwise have lived a long and useful life. Such results will continue so long as recklessness and

thoughtlessness exist on subjects of so great importance to the race as marriage and parentage. Nature is inexorable ; she never pities, never permits her children to live contrary to law and receive her blessings.

CHAPTER III.

MICRO-ORGANISMS AS THE IMMEDIATE CAUSE OF
CONSUMPTION.

IN the last chapter we considered the remote and the immediate causes of consumption, as they have been considered in the past; but within the last decade another and more direct cause has been discovered. For a very long time there has been a vague belief among many people that the disease may be communicated from one to another, but not to the same degree that small-pox and scarlet fever are capable of being communicated. Medical men have generally been sceptical on this subject, though this scepticism has not been universal. Several bacteriologists and pathologists have believed that they had discovered in consumptive patients a micro-organism, which they held was the cause of the disease and of its contagiousness; but there was no certainty until Koch let in a flood

of light upon it by his investigations. We ought not to forget that the pioneers who paved the way for him are entitled to much credit, though they did not succeed in making a perfect demonstration.

What are they, and what is their object and place in nature? To this I reply, that they are, so far as is known, the lowest and smallest living organisms of which we have any knowledge. They belong to the vegetable kingdom, at least botanists classify them as vegetable, but without chlorophyl, the green colouring matter common to vegetables. They have some of the characteristics of both plants and animals, and it is not strange that they have been called animal by some scientists. They multiply by division and by spores, and, under favourable conditions, increase rapidly, so that a single one may become many millions in a few days.

If we were to ask these organisms what is their object in life, they would, no doubt, say, to feed and multiply. Indirectly, however, they accomplish a great deal more than this.

If, however, we were to interrogate Nature as to their uses, we should receive quite another reply. Nature would tell us that their use is to cause a rapid decay of those substances which

are dead. If it were not for them, the fallen leaves in the wood, and the dead, uprooted trees, and also all the dead animals and insects, if not destroyed by fire or eaten, would continue in the form in which they fell and died, and be reduced to their primitive elements only by the slower processes of oxydation. The micro-organisms, by the aid of heat and moisture, attack them, and they decay and become fit for food for other plants. They do not always wait for animals and plants to die before attacking them, but do it whenever conditions are favourable, as is often the case when they are debilitated. A feeble organism is less perfectly protected against them than a strong one; but even a strong one may fall a prey when they are present in large numbers, or under very favourable conditions. Like human beings, they are not all alike. Some are friendly, and do us no harm, but rather good; the common atmospheric ones do not probably cause disease; the dangerous ones only, like thieves and murderers, are to be feared. Those which cause diphtheria, scarlet fever, small-pox, measles, and consumption, are most pernicious in their effects on human beings.

What is the evidence that consumption is

caused by one of these minute, microscopical organisms? This is an important question.

The evidence upon which the advocates of the theory that consumption originates from a special germ, base their arguments upon experiments made on animals, a method to which the opponents of vivisection vigorously object. Nevertheless it is the best evidence they have to offer. When Koch found bacilli in the sputum, and also in the tubercle, from the lungs of consumptives, he at once attempted to produce the disease in animals, notably the guinea pig, rabbits, cats, and dogs, by inoculating them. In this he was remarkably successful. The experiments were made with the greatest care. Some of the animals were inoculated with other material, and some kept without being inoculated at all, so as to furnish negative as well as positive proof. Every effort was made to exclude sources of error. Some of the experiments consisted in making a series of cultures of the germs in sterilised blood serum, by laying a piece of the tubercle on the surface of the blood serum, and keeping it at a proper heat, excluding other germs and allowing those in the tubercle to multiply in the serum; from this serum germs were planted in other like prepared serum, and

so on till five or more cultures had been made ; that is, germs had been cultivated whose progenitors, five or more generations back, had come from a consumptive's lung, but none of the immediate ones had. Animals were inoculated with these germs, and they, in every case, developed consumption. These experiments were repeated by competent persons in different parts of the world, with results, if not quite so uniform, yet nearly so. There were sufficient failures to cast some doubt upon the subject ; but Koch maintained they were due to faulty manipulation.

In some cases consumption developed when other material, or none at all, was used. But these failures have not prevented the very general acceptance of the belief that consumption is caused by a germ which gains access to the lungs, finds a suitable soil there for its growth and multiplication, and in the end destroys these important organs.

Dr. Koch himself says : " The time has passed when the specific microbes of certain infectious diseases can be regarded as harmless or accidental parasites. Methods of culture and inoculation experiments leave no room to doubt the casual relation of special micro-organisms to

certain specific diseases. That this discovery has hitherto led to no striking therapeutic results argues nothing against bacteriological study. It has already given rise to many measures of undoubted utility, such as the sterilisation of milk, the disinfection of morbid excretions, the purification of water, &c., and has also furnished a sure method for diagnosis of certain diseases, such as tuberculosis and cholera. The fact that we have hitherto failed to discover the specific cause of rabies, whooping-cough, yellow fever, and other diseases is no argument against bacteriological methods as at present employed. It is very possible that the causes of these diseases belong to a different order of micro-organisms, not to be discovered by our present methods of research. In favour of this view is the fact that the micro-organism of malaria is a plasmodium belonging to the protozoa, and not to the vegetable kingdom. We are just entering the second stage of bacteriology, where we shall have to do with protozoa as disease-producing germs."

The bacillus of the tubercle is exceedingly minute, being about 1-10,000th of an inch long. Before it can be seen under the microscope it must be stained of a dark colour so as to make

a strong contrast between it and the material in which it is embedded. It burrows into the tissue, one may imagine, very much as a mole burrows into the earth, throwing up a little mound of gray granulation around, and this mound constitutes the tubercle. In a suitable soil it multiplies and spreads; but it can do this only in a person whose condition favours its growth. In a perfectly healthy organism it is destroyed, and does not destroy.

How the bacillus finds its way into the lungs must always remain more or less a conjecture, but there may be several ways. The chief one is with the air we inhale. They are, no doubt, very generally present wherever the climate and the temperature allow them to live. The winds carry them from one place to another. Probably few of us do not take them into our lungs every day, probably many times a day; but the number may be small, or the condition of our bodies such that they are not tolerated.

The way into the lungs is a long and tortuous one. The obstructions to the entrance of foreign bodies are numerous; the mucous membrane lining the passages may be sound, and not allow them to pass into the system. A healthy person's tissues are always on the alert to oppose the

reception of what is injurious. But in the case of persons who live much in-doors, perhaps work many hours in factories and stores or shops, there may be some one suffering from the disease, consequently the air may contain them in greater abundance. The ventilation being deficient, they are not carried away but inhaled, and those who have been weakened by a sedentary life, or those who are disposed to colds and catarrh may furnish a suitable soil for them.

It has been suggested that they sometimes find their way into the system through the food. This may occur when the flesh of consumptive animals or their milk is consumed. So common is consumption in cows, that some veterinary surgeons have expressed the opinion that a majority of them suffer from it before their usefulness in the dairy is over. My own observation is against this opinion ; but my experience has been mainly in dairies, not confined in stables, or fed on slops or other unnatural food, but those which have been kept in the open fields. I doubt very much if any very large number of consumptives have received the germs either from the milk or flesh of animals infected with the disease ; still it is well for all to be on their guard in this respect. There may be more

danger than we are aware of. We can very properly reduce at least one-half or two-thirds the quantity of flesh consumed and substitute for it well-prepared cereals. Some are able to go further than this, and eat only animal food from fish and oysters, or animal products as eggs, milk which has been sterilised by boiling, and butter. As for substitutes for milk, I have no doubt but that in time we shall have them in abundance. They will come in the form of vegetables, soups and gruels prepared so as to contain more nourishment than milk, and be free from every objection that can be urged against the latter article ; but as the subject of food will require further discussion I will leave it for future chapters.

PART II.

PREVENTION AND TREATMENT

IN ITS

EARLIER STAGES.

CHAPTER I.

PREVENTION.

IN the early history of mankind, when the intellect was shrouded in darkness, and superstition prevailed everywhere, diseases were ascribed to every imaginable source excepting the true one. Even among uncivilised races this is true to-day, and among civilised ones there are those who still ascribe them to supernatural causes, as the punishment of his people by an angry God for their sins. So long as a supernatural origin was believed in, preventive medicine could have little play. An Indian medicine-man frightens away the evil spirits that afflict his patient by noises and by incantations of a most distressing kind. A more civilised man will fast and pray to God to shield him from evils which he has brought upon himself by violation of the laws of his being; but a rational person will discover the true causes if he can, and then remove them. It is

the province of hygiene to do this, and its rapid advance during the present century is one of the surest evidences of human progress that we can have, and of the beneficent results of the study of science and its application to human welfare. From this standpoint, how shall we prevent consumption, or cure it before it exists? Shall it be by magic and the incantations of superstitious races? Shall it be by pleading with our heavenly Father that He will not inflict on us the punishment we deserve for our physiological sins? or shall it be by obedience to those laws of our being which He has instituted for the government of our conduct? Let us rather pray that we may find out what these laws are, and obey them so far as is in our power.

The prevention of consumption should begin before the birth of the child. If we could only choose our ancestors, and go back a few generations to find those who were strong, hardy, industrious, and whose instincts were perfect and intelligent, it might be well; but not being able to do this for ourselves, we must do the best we can for our children. They should not be begotten when the constitution is exhausted by excesses of any kind. The prospective mother should live a rational healthy life, not an idle, dissipated one.

If there is any hereditary taint it should be overcome in the children by living rightly, by keeping the bodily vigour up to a high standard with good food, abundance of fresh air, as much out-of-door life as is possible or needful, and by scientific or natural physical culture. Mothers who confine themselves in-doors in unventilated rooms, other conditions being the same, have the most feeble children. The children born in cities, where such conditions are more frequent, have the highest death rate, and those which survive infancy have the poorest constitutions. Those who live in malarious regions are often so injured by malarious air that equally bad results follow. Those who are overworked or poorly nourished cannot give birth to hardy offspring. Even a person not quite so vigorous, who lives a rational life and is much out of doors, may become the parent of healthier children than one who has a good constitution but lives in a confined and vitiated air.

Excessive child-bearing must also be avoided, for it leads to degeneration and is a cause of consumption. Just what excessive child-birth is must be determined by each person separately. Two or three will exhaust one mother more than eight or nine, or even a dozen, another. It is not

child-bearing, but excessive motherhood that injures mothers. Child-bearing is both natural and healthful, and promotes longevity if not in excess.

After the child is born it should have rational care, and be given a good chance in the race of life. The art of caring for children should be mastered by every parent, and mothers should not trust altogether to their instincts or to what is told them by others as ignorant as themselves, or even to a little reading, but make the subject a profound study. The children should be well fed, always have abundance of fresh air and light, be suitably clothed, and their physical culture receive proper attention. As they grow into youth, there should be no over-crowding, no exhausting cares, but every opportunity given to them to grow physically, as well as morally and intellectually. Nor should there be any idleness. Idleness gives opportunity for a morbid development of every kind of bad habit. Employment is essential ; it is only excessive work that injures their bodies and lowers their vigour.

CHAPTER II.

PREVENTING COLDS.

FOR the adult, one of the first things to be done is the prevention of colds. As already explained, they are indirectly, if not directly, causes of consumption; and so every cold prevented is so much gained, while every one taken is a positive injury, if not a danger. The best methods of preventing colds must be learned. Those who live much out of doors are less liable to them than those who render their constitutions feeble and tender by living too exclusively in the house. This, then, may be laid down as a rule, that to prevent a cold one should live out of doors as much as he can.

The next method to be employed is the cold morning bath, with friction. This rightly used hardens and toughens the skin. It is through the skin that colds are contracted. When one is over-heated and excited, or when one is delicate and sickly, the chill from exposure,

acting on the nerves, terminating in the skin, lowers the tone and vigour of the whole nervous system, acts on it like a shock, and results in a cold. The philosophy of the subject is complex, and need not be entered upon here. The cold bath, which should be of short duration, must be followed by thorough friction, with a dry sheet thrown around the body, and with the bare hand, until there is a glow and redness of the skin that insures a good result. Especially should the friction be thorough over the chest, and back, and on the feet. A cold foot-bath at night, with hard rubbing after it, will be an additional safeguard. On the back of the neck, and over the shoulders, the rubbing must be thorough. This is a point where the nerves seem most sensitive to cold air and draughts. Sometimes a glass of water, as hot as can be borne, taken after the bath, is needed to insure a good reaction, or some suitable exercise out of doors, which is not very severe, will be all that is required to produce the same result. One must learn to use his judgment in this matter. If a large quantity of cold water, and but little rubbing are used, then more harm than good may result. It is not so much the former as the latter that does the good.

Unfortunately there are persons who do not bear cold bathing well. Whether the fault is in their methods or their constitutions, or both, I will not stop to inquire. There is a substitute for these by friction with hair gloves ; or, if this is too severe at first, linen ones, over the skin till it is well reddened and warm. It answers nearly all the purposes of the bath, and may be taken for a few minutes on rising and on retiring. In nearly all persons with a tendency to consumption, the skin is exceedingly delicate and weak, and must be strengthened and toughened, and this method is easy to use and often proves of the highest utility. I have seen such excellent results of preventing colds, and consequently consumption, by attention to the skin, that I speak confidently. I have known those liable to these minor ills, often having three or four in a season, by this practice, to escape them for years at a time ; or, if not entirely escaping, suffering so slightly as to make them almost insignificant. The greatest benefit from the bath, and from friction, comes by toughening and fortifying the skin, and fitting it for fulfilling its functions perfectly.

Another means of preventing colds is to fortify the nervous system against them by vigorously

exercising the will power whenever there is need of it; as, for instance, when one is exposed to a cold, a draught, or other injurious influence. The effect of this effort of the will is to keep up the circulation of the blood, and the supply of nervous force in the organs likely to be affected.

If a chill actually comes on, then it is useful at once to drink a pint or more of water, as hot as it can be borne, to take a hot foot-bath, and to go to bed and get warm and comfortable as soon as possible.

I hardly need to mention that care is necessary to avoid sleeping between damp sheets, in new houses before the walls have become dry, in standing in the cold with wet feet, in not changing from heavy to light clothing too soon in the spring, and especially in not eating an indigestible meal after becoming exhausted by overwork or exposure. Overloading the stomach with indigestible food is a frequent cause of colds. It is far better to wait a little before eating if one is very tired, or to eat slowly and moderately, so as to give the stomach time to regain its powers.

CHAPTER III.

ENLARGING THE CHEST.

IN a majority of consumptives there is less lung capacity and less strength in the muscles of the thorax than in others. They take in less air at each inspiration; respiration is more feeble, and there is a sluggishness of action in this part. These are conditions which favour the development of micro-organisms in the lungs. Where respiration is full and complete, they do not thrive. The tubercles which develop in the lungs are most frequently found first in the apices of these organs, where respiration is most feeble. It is important that the chest, when small, be enlarged in early life, for then its enlargement is most easily effected. It is not difficult to accomplish it. There are many methods, some of which are suitable for every case. The first one costs nothing except a little time and effort, and consists in daily and frequent deep breath-

ing, or inhaling air into the lungs so as to inflate them to their fullest capacity. It should be practised from half an hour to an hour every morning before the person arises, and at other suitable times during the day. Let the person begin cautiously practising the exercises about ten minutes at a time, just before getting out of bed and a little while before the hours for eating and retiring. Add a little each day to the time spent, and at the end of a month take the exercises four times daily, for fifteen minutes each; or, if the time cannot be arranged conveniently in this way, then practise longer before breakfast. Half an hour, or even an hour, with short intermissions, will be nearly as useful. Should there be slight dizziness, or a rush of blood to the head, desist for a few moments and then begin again carefully. While this dizziness may be annoying it will do no harm, and after a few weeks it will pass entirely away.

The exercises should be taken in pure air, and the clothing should be so arranged as to allow perfect freedom of motion for every part of the body, including the neck, chest, and abdomen. If taken lying down, the head should be lowered so as to be nearly on a line with the body.

If the exercise is done in company with others,

do not allow any emulation or strife with them to lead to extremes, for this may do harm. It is better for each one to do the exercises perfectly rather than to go beyond his strength. Striving for perfection will not cause any one to over-do.

There are several positions for the body when practising deep breathing which I will give :

1. Lying flat on the back with only a light pillow under the head. The hands may be by the side or folded under the head, or in any position which does not restrain free movements of the breathing organs.

2. Standing perfectly upright, with the heels together and the toes turned out, the hands on the hips or folded behind the back or over the chest, or behind the head, as may suit the fancy and give variety.

3. Sitting in a reclining chair that does not in the least cramp the body.

4. Sitting upright in a straight-back chair, with shoulders thrown back, and hands in any unrestrained position.

For the invalid, the lying or sitting positions are best because less strength is required ; for others all positions may be used.

The following are the best methods :

1. Take a full inspiration by simply contracting

the diaphragm and pushing the abdominal organs down as far as possible; hold the air for a moment in the lungs, and then exhale it through the nose slowly.

2. Take a full inspiration, contracting the diaphragm and expanding the lower ribs all you can; hold the breath a moment and then exhale slowly.

3. Take a full inspiration, contracting the diaphragm and expanding the whole chest by the elevation of both lower and upper ribs; exhale slowly.

4. Without contracting the diaphragm take a full inspiration by enlarging the whole of the chest, elevating every rib as much as can be done. Hold the breath a moment and then exhale slowly.

5. Take a full inspiration into the upper part of lungs, elevating the upper ribs only to the fullest extent by expanding them all they will bear without over-strain. Exhale slowly.

6. Expand one lung at a time as fully as it can be done without the other; exhale slowly. Often it happens that one lung is weaker than the other and does not fill so quickly and easily. This weakness must be corrected by giving special attention to it.

7. Do any or all of these exercises, holding the

breath as long as is comfortable after the lungs are full, and then exhale slowly.

8. Do the same, and holding the breath only for a moment, exhale it as slowly as is possible, that is, be as long in making the exhalation as you can; this may cause slight dizziness, if so, rest a few moments and then try it again.

9. Take exercise No. 3; fill the lungs as full as possible, but do it quickly, and exhale all the air from the lungs you can through the mouth as suddenly as possible; rest a moment and repeat it. Do this a few times, but never to excess. In this exercise the diaphragm should, in returning, be forced up as high as it will go. This exercise ventilates the lungs more thoroughly than any other, and should be performed in as pure cold air as can be secured without unnecessary exposure.

10. Take exercise No. 3, and when the lungs are comfortably full of air percuss with both hands over them, gently at first, and by degrees harder, but never so hard as to cause the least pain or inconvenience. This will prove very beneficial. For the weak it should be done while they are lying down.

11. The same may be done striking over the

lungs with the closed fists moderately hard for a moment, after which exhale the air from the lungs naturally and then rest.

12. I think I have observed good results from expanding the left lung as much as can be done without discomfort, holding the breath and striking gently over and around the region of the heart with the closed fist. Object: To promote nutrition in it and render it stronger, The heart is usually weak in those disposed to consumption. This exercise increases, I believe, the circulation in the coronary arteries, and will be beneficial.

13. Stand perfectly erect; fill the lungs as directed in exercise No. 3, and have some one percuss over the upper part of them with the flat hand from fifteen to thirty seconds, while the patient holds his breath. The hands of the patient may be placed on the hips, the thumbs forward. Repeat a few times, but always with caution.

14. The same as above; but as soon as the lungs are full fold the hands across the breast, bend forward and have some one percuss for a few seconds over the back, from the shoulders down as low as the lungs extend. No harm will be done to continue the percussion down to the

hips. This is often a very grateful exercise, and serves to stimulate the spinal cord and its ganglia, and improves nutrition in them.

15. The same again, with the hands over the head, and when the lungs are full the attendant standing behind the patient, percusses him rapidly but gently on each side under the arm-pits. The blows should be given at the same moment with each hand. These exercises may be taken when the lungs are partially inflated. In such cases the expiration should always be natural, not forced.

16. The patient, lying on his back, fills the lungs as in Exercise No. 3, and then holding the breath, if he is strong enough, let him percuss himself over the stomach and abdomen quite hard as long as he can comfortably hold the breath. The abdominal muscles may be alternately contracted and relaxed. This exercise is designed to promote circulation and nutrition in the digestive track, and improve digestion. I know it to be of great value.

The following are after Delsarte and a trifle harder; they will give variety :—

1. With lungs slowly filled hold the breath and count five with force, pushing abdomen forward at each count.

2. Inhale very slowly through the nostrils; exhale slowly through the mouth.

3. Lying flat, raise a wand or cane slowly up with arms parallel until they lie flat back on the mattress, the lungs full when arms are highest. As arms descend, exhale slowly. This is a strong exercise, and should be given to advanced patients only.

4. Fill the lungs through one nostril, holding the other; exhale through previously closed nostril; inhale through nostril just used in exhaling, and then exhale through the other, thus alternating the nostrils through which the air is drawn.

5. Fill the lungs deeply, hold the breath, hiss it out sharply from between the closed teeth.

6. Inhale quickly through nostrils; exhale slowly through mouth.

Rest and breathe deeply after each exercise.

There may be special reasons why some of these exercises ought not to be used, or used only to a limited extent. This should always be borne in mind. It would be better to take only one partial inhalation in one, two or five minutes and then rest than to over-do. After a while the patient can tell better how much is beneficial than any one else, and all his powers of observa-

tion should be educated. In curing all diseases, and especially consumption, the patient must do most of the work. The physician and teacher of physical culture are only guides and helpers.

CHAPTER IV.

INDIAN CLUB EXERCISES.

ANOTHER method for enlarging the chest is the use of Indian clubs, which are so well adapted to the young and middle-aged. It is better for the person to take a sufficient number of lessons from a good teacher, so as to learn how to do the exercises with precision and accuracy than to try to go through them imperfectly and without interest, as must be the case if an effort is made to learn them alone. The club exercises develop the muscles of the chest and arms, and enlarge the lungs in a most remarkable manner. They train both sides of the upper part of the body alike. The exercise also benefits the brain, and this is important, for there are many motor-centres in this organ and in the spinal cord which we ordinarily neglect to educate. Such is the case particularly with the centres which serve the movements of the left hand and the left side of the body. Perhaps parents will be

more ready to develop the natural powers of the left hands of their children, giving them thereby two equally useful hands, if they know that the health of the brain and spinal cord are improved at the same time. I may also say that in a majority of persons who have a tendency to consumption there seems to be some defect, some weakness in those nerve centres that control respiration and the complete expansion of the lungs. There is not, evidently, sufficient nerve force to energise the machinery for breathing and cause it to move vigorously. By suitable physical training this defect may, in part at least, be rectified. The Indian club exercises, if judiciously used, offer a good means of securing this result for both sides of the body and the nerve centres in both hemispheres of the brain. The club exercises also compel an upright, manly position of the body, the importance of which need not be emphasised.

The excessive use of the clubs, to which some enthusiasts are inclined, may develop the muscles of the arms and chest abnormally, and this should be guarded against. All excesses in physical training are to be avoided. Moderation cannot be too strongly impressed on those for whom these chapters have been prepared.

CHAPTER V.

ROWING.

ANOTHER means of enlarging the chest and strengthening the constitution is by rowing. It has some advantages and some disadvantages over Indian clubs. The advantages are that it is a most delightful exercise, stimulating the nervous system in a way that no amount of practice at any indoor method of training does. What is more delightful than to sit in a trim boat, either with or without a companion, and propel it along the surface of the water, now fast, now slow, now to the right or the left, watching the ripples made by the oars, the flashes of light from the waves, the circles of tiny waves created by the drops of water that fall from the blades as they are lifted from the stream or lake? Or, if it be rough, what delight the rower takes in guiding his craft safely over large waves and even billows as they rise

and fall in rapid succession! Many and many a time has my own heart been filled to overflowing with adoration for the Author of Nature and for Nature itself when in my boat I have been riding serenely and happily over the waves, and so I speak from personal experience.

The disadvantages to be mentioned are that the exercise cannot be practised at all seasons of the year, nor is it available every day or in every part of the country. Only those who are fortunately situated can enjoy the fullest use of the oar and the boat. These, whether male or female, should use it for all it is worth, and, indeed, the fact that it cannot be used at all times makes it more delightful when it is in season. We can then rest from other artificial exercises which may have become monotonous by continuous use, and take to rowing which is rarely wearisome.

Some precautions may be necessary to those who are very unpleasantly affected by moist air. The atmosphere over water is more highly charged with vapour than that over land. This is a disadvantage, and those to whom moisture is injurious must choose that part of the day when the sunshine will counteract the injurious effects of the moisture.

I remember very well, many years ago, having occasion to be rowed across the Hudson River from a little station not far from Newburgh. Entering into conversation with the man whom I hired, he informed me that six years before physicians had pronounced him to be in the first stages of consumption. Being unable to do systematic labour, he found employment in ferrying passengers over the river. The effect was to restore him to a comparatively good state of health and strength.

In beginning to row, let the pupil start with the idea that the oars are only levers for urging his boat forward, and let him use them faithfully for this purpose alone. If he does this he will soon learn how to use them correctly. To produce the best results he must put the blades into the water squarely. He must feel that all pulling and hauling, jerking and scooping, are bad. He need not be troubled by the curved course his hands must take. The pull on the oars must not vary correspondingly in direction; but should be made parallel to the boat's length. By a little thoughtfulness and observation of the way the oars act on the water, he will see that the boat goes forward most easily and rapidly when the greatest amount of water is driven along

the surface backwards. None should by bad management of the oars be driven upwards or downwards. This will produce a beautiful, well-formed swirl in the water, and not a mere roughening or stirring of it up. In the beginning it is better not to take too long strokes, or too rapid ones. By going slowly and watching the movement of the oars and the water, the rower will soon form a correct style, and habit will render it easy. The blades must be kept square, and no force wasted by allowing the water to slip over or under them, nor should any part of the blade be in the air, and nothing is gained, but there is some loss, by allowing it to go deep in the water. At the end of the stroke the blade should be brought neatly out, and then given a short half turn, kept flat, so as to least oppose the air, and by a forward movement of the body be brought to the right place for squaring and dipping them into the water once more. A good teacher will save much time, and facilitate the progress of the pupil. He will show him how to use his arms, legs, feet, hands, wrists, and the body as a whole; but the more important part of the work is given in the foregoing advice. Avoid haste and all excitement; use the brain as well as the body, and try to make every ounce of force expended

tell in sending the boat forward with perfect bodily movements, so they shall be graceful, easy and natural. Such movements do not exhaust, but benefit, the patient.

It has been objected that girls and young women cannot take advantage of rowing as boys can, and to some extent this is true; but I have taught a good many of them to row in quite rough water, and they certainly enthusiastically enjoyed the exercise and evinced skill and carefulness. I believe girls may be as greatly benefited by this mode of training as their brothers, providing they are properly dressed about the waist, so as to allow the most perfect freedom of motion to the muscles of the arms, shoulders, back and abdomen. If they will not dress themselves suitably they had better let this exercise alone.

Edward Hanlon tells us what he thinks the best methods for amateur oarsmen are. He says: "In 1872 I began life as an amateur oarsman. Like all beginners, I put myself in the hands of a trainer. I had an idea that training meant tearing one's self to pieces with exhausting work and literal starvation, and this seemed to be my trainer's idea also, and for a long time I was foolish enough to follow his methods. After he had got me into a much worse trim than

I was at first, I rebelled, and since that time have followed my own ideas, and instead of breaking down at the end of five or six years, am physically as capable as in my early life.

“After I had begun my own training, my ideas regarding this important part of rowing matters underwent a complete change. Instead of starving myself and doing hard work I built up my constitution by light work and eating what my system craved in the way of more substantial food. When I am in training I eat what I desire, excepting, of course, condiments and other indigestible things.

“It is difficult to prescribe proper training to suit everybody. All beginners are not alike. Food for one would be gall for another. The first thing for one to do is to study his own constitution well. He ought to understand the cravings of his stomach first. If this fails, that settles him. There are hundreds of athletes who put themselves in excellent condition on two meals a day. I would not advise any beginner to try this plan unless he knows he can stand it. There should be moderation in food, as there must be moderation in exercise. But the youth who starts out with the idea that he can starve himself to get into condition will come to disaster.

Nourishing food, no matter how much, if well digested, is what every beginner wants to put himself in good physical condition. It makes but little difference when the food is taken, providing it be with regularity. A good breakfast can be made of oatmeal porridge, cracked wheat, brown bread and butter, a steak or chop and a little fruit. Drink cold water, if necessary, but it is better to drink nothing while eating. For dinner, which should never be taken after 6.30 p.m., take a piece of beef or mutton, as large as your hand, with potatoes and other vegetables and brown bread. Don't eat too much, and never touch dessert excepting fruit. Always drink one or two tumblers of pure water on going to bed and on rising in the morning. Take a nap of an hour or two in the middle of the day, for it will be of lasting benefit to a man in training. Get at least nine hours' rest at night. Tea or coffee are specially injurious to many, just as cold water and pure cream are helpful to all. Salt, pepper, spice, ginger, cinnamon, nutmegs, cloves and mustard are all hurtful, and, if used at all, should be used with great moderation. How true is Rousseau's saying: 'The stronger the body, the more it obeys; the weaker the body the more it com-

mands.' To be trained too fine is a hundred times worse than no training at all.

"Professional trainers invariably give the beginner too much to do. They will make him do the most absurd things, which in the end pull him down and make him as weak as a kitten. It takes a trainer a year to understand a man's constitution; and, in the meantime, he will probably ruin him physically. That is why I claim it to be a great risk to put one's self in charge of a man whose methods of training may not suit the constitution of the person.

"If one starts out to train and uses whisky and tobacco, he must break himself of both habits; they are positively injurious."

CHAPTER VI.

VOCAL GYMNASTICS.

I NOW come to another method for preventing and curing consumption, of great practical importance. I refer to vocal training. In vocal culture much benefit is received in developing the voice, making it clear and strong and beautiful, and this ought to be sufficient compensation for all the labour and pains bestowed upon it; but, in addition to this, the chest and all the respiratory organs are educated, greatly enlarged, and strengthened. Dr. Morrell Mackenzie says, on this subject, "So far from injuring the general health, the teaching of singing in childhood is likely to prove highly beneficial, especially in cases in which there is a tendency to delicacy of the lungs. By the healthful exercise of these organs in singing, the chest is expanded, the muscles of respiration are strengthened, and the lungs themselves are made

firmer and more elastic. The rare occurrences of pulmonary diseases among singers is well-known. Of course it must be understood that the voeal exereises are to be strictly moderate, both as to quality and quantity; that is to say, the lessons must be short, and at the most only the ten or twelve notes, which form the average compass of the ehild's voice, must be used. On no aecount should there be the least foreing or fatigue. I think there ean be no doubt that voeal training in ehildhood, if properly earrried out, is not only not hurtful, but, on the eontrary, distinetly advantageous."

In giving voeal eulture to ehildren, there are no real difficulties in the way, though there may be apparent ones. In the first plaee, ehildren should be eneouraged in their sports to use their voices freely. They do it voluntarily and naturally where they are not forbidden or diseouraged, in ealling, hallooing, laughing, and even yelling. Even the babies strengthen their voices and lungs by erying. Parents may eonsole themselves with the thought that some good results from it; but the youngsters, boys and girls, both lose many of the delights of ehildhood if they are not allowed very great freedom in the use of the voice. This spontaneous activity of the

voice and lungs is, however, only a part of the training which the young should receive. Our public schools are now so almost universal that nearly all children can have the advantages of good vocal culture. We might very properly leave out history, and some other studies which can be acquired later in life, for the delightful art of song. Music, poetry, and gymnastics were the most important branches of education with the ancient Greeks. With this simple curriculum they produced great men and beautiful women, whose influence is still felt in all our educational institutions.

The methods which have been perfected for teaching vocal music are so good that no school can afford to be without them as a part of the daily drill. I cannot here enter into details as to how vocal training in schools should be conducted. I can only say the method should be thoroughly scientific, so as to interest both boys and girls. The simple teaching of music to children by rote, as is the case in many schools, is not sufficient. There is not enough intellectual effort in it to attract pupils. Boys who manage to get at the heart of things by a sort of intuition often have the feeling that such exercises are only suited to girls, and so far as they can they

avoid them. You cannot offend a boy more than by letting him think that he is doing a girl's work. But if, in addition to the singing, the whole science of music is taught at the same time, it will interest both sexes equally. As a mental discipline, teaching the science of harmony, melody, rhythm, &c., it has great advantages, and the interest felt is never lost. Singing by rote may be combined with the scientific method, but should never be substituted for it.

When we come, however, to those who are older than school children, who may have a tendency to consumption, we must adopt special methods. Vocal culture for these may be accomplished in two ways; by the practice of such exercises as are used in training singers, or by those used for readers and speakers. For the best results, it is desirable that the person have a teacher long enough to give him a good start; he can keep himself on the right line afterwards. A good instructor will give the best position for the body, mouth, tongue, arms, chin, neck, and all the organs used in producing the voice; will correct all defects of articulation, incorrectness in the use of the organs, and show how to produce a clear, strong, beau-

tiful tone. In addition, he will inspire the pupil with his work, so it will be easy to continue it for a long time.

After having made a good start, an organ or a piano helps wonderfully to keep the voice in tune.

The exercises of the scale, with any vowel or syllable, may be practised long enough every day to train the voice and chest thoroughly, and keep them in perfect health. This practice will, in most cases, where the other hygienic habits are correct, secure those with a tendency to consumption from its attacks quite as effectually as if they had no such tendency.

It must be explicitly understood that the practice of vocal culture should be kept up for a long time. A little practice now and then is not sufficient. It is to some extent a life work.

It may be objected that this is taking the work of preventing consumption out of the hands of the physician and putting it into the hands of the patient himself. To some extent this is true; but I am sure no thoughtful physician will object to what I have said, and I know many will commend it. There are multitudes of people who take such rational care of their health that

they have little need for doctors, and if we can add to their number from a class who tend to the worst of all diseases, I am sure medical men will be the first to rejoice.

CHAPTER VII.

SPECIAL VOCAL EXERCISES.*

I HAVE already intimated that weak lungs can be strengthened by vocal exercises, as other parts of the system can be by exercises suited to them. Experience has shown that this is not mere theory, for thousands to-day are enjoying good health who, but for such exercise, would have been in consumptives' graves. The exercises prescribed have, for the most part been devoted to other interests of the sufferer than those which arise from a hope of restoring health. We know that "walking for the health," without any other object in view, is by no means so useful as taking the same amount of exercise with some object of utility or pleasure in view.

Believing that the same principles apply to exercise of the lungs, it is proposed in the fol-

* This chapter has been prepared with the advice and assistance of Prof. C. S. Royce.

lowing pages to give specific directions which, if followed carefully, will strengthen weak lungs, and in many cases restore those that are diseased to health, and at the same time improve the conversational, the reading and the speaking voice. That there is necessity for such improvement our daily experience in using our own voices, and in listening to those of others, gives abundant proof.

GENERAL DIRECTIONS.

It will not be possible to give such specific directions as to the frequency of the exercises, length of time to continue them, and the circumstances under which each shall be done, as will meet every case. This, however, can be said: No one should practise in an atmosphere rendered impure for want of ventilation, nor immediately after a meal. The clothing should be so loose as to allow perfect freedom of movement. The atmosphere should be cool, but not uncomfortably so. Those who are quite weak will be able to practise but a few minutes at first, while others will be able to practise fifteen, twenty, or even thirty minutes at a time. The rule should be not to continue until exhausted. If dizziness is produced, as in many cases it will be, it should

be received as evidence that the practice is needed; but it should not be persisted in at that time without resting a little, when it will cease, and the practice may be resumed. In this manner it will gradually wear away.

FIRST MONTH.

Stand quite erect, with the hips and shoulders drawn well back, the hands on the hips, the elbows thrown back, and the chest pressed upward and forward. In this position inhale forcibly through the nose, with the mouth closed. Let this be done by enlarging the abdominal cavity while the upper part of the chest is pressed forward and upward. Now exhale forcibly through the nose by contracting the abdominal muscles, thus diminishing the size of the abdomen. The directions with reference to the chest and abdomen are of great importance. In this manner the action of the diaphragm, a muscular "partition across the body just below the lungs," the muscles of which are contracted when the abdomen is enlarged, and relaxed when the abdomen is diminished in size, will aid in giving free exercise to the lungs, from their upper to their lower extremes. Thus: Inhale and

exhale ten to fifteen times, according to the ability to endure the exercise. After a few minutes' rest repeat the process. Let this be done at stated intervals several times a day for the first week.

The manner of breathing here described is the natural manner, as may be seen by looking at a naked infant when laughing, crying, coughing, &c., or at a dog, horse, ox, or any other mammal, when breathing forcibly, with or without the utterance of sound. By modes of dress which prevent the free action of the abdominal muscles, and by bad habits formed at home, and in social circles, too many of us use only the upper part of the lungs in respiration and for vocalisation. This is one cause of weak lungs and sharp, superficial voices so frequently met with, even among educated persons.

During the second and subsequent weeks, for one month, add to the above exercises that of mechanically enlarging the throat, in the manner that all may have seen birds enlarge theirs when singing. This is to be done by a tension of the muscles that lead from the neck backward. In men this will draw the *pomum Adami*—"Adam's Apple"—downward. In both men and women there will be a protruding of the upper part of

the neck, that will be very perceptible to the eye, or to the hand if placed on the neck. It is the movement that is often made by ladies when desirous of ascertaining whether the bonnet strings are tied tight enough. Having thus enlarged the throat, relax the muscles made tense in the above action, and repeat the exercise several times, until there is a slight sense of fatigue. Let these two movements be repeated several times a day during the second week.

During the third and fourth weeks of the month there may be a combination of these two movements. Inhale through the nose, then—retaining the air in the lungs for a few seconds, where the heat of the body will cause it to expand and press the air-cells gently—enlarge the throat as above, and expel the air forcibly through the open throat and widely opened mouth. Repeat this many times.

Next, inhale and exhale, with very moderate force, through the mouth and throat, opened as above; again do so with moderate force, and again with considerable force; now fill the lungs quite full, and, opening the mouth and throat freely, let the air escape very slowly, and with a noise in its passage through the throat like that

heard when a sea-shell is held close to the ear. It will require much patient practice to do this last in such a manner as to keep the emitted sound soft and regular, like that of the sea-shell. In all these exercises be sure to keep the upper part of the chest elevated and pushed forward.

The exercises here described are not only invigorating and health-giving, but they form the basis for strong, deep, smooth tones of the singing or speaking voice.

SECOND MONTH.

If the reader has faithfully followed the directions of the exercises for the first month he will now be ready to receive and profit by further directions.

First, let me say that while following the directions now about to be given, the exercises already recommended should be repeated daily; and beside the tranquil breathing there recommended, as soon as the lungs become strong enough, so that it can be done with safety and comfort, the air should be expelled suddenly through the open throat and mouth, increasing the suddenness, until it is expelled with nearly the abruptness of a cough.

The most common faults in reading and speaking probably are those of not properly filling the lungs, and not keeping the chest raised and pressed forward, which not only cause poor, weak voices, but irritate the lungs. Perhaps the next most common fault is that of not opening the throat freely while using the voice, and this causes "minister's sore throat," as well as harsh, unpleasant tones. The directions already given, if followed, will cure these difficulties.

Now, let us try to cure another fault—that of sending sounding breath too far forward in the mouth as we form the voice. If persons will watch themselves, the majority will find that they permit the sounding breath to strike the roof of the mouth near the front teeth. This should not be. The ordinary tone should be directed against the back part of the roof of the mouth.

The vail of the palate, which is to a greater extent than is generally supposed under the control of the will, should be held quite tense, so that the sounding breath, in passing, shall not pass over a loose, flabby muscle, the effect of which upon the ear is not unlike that of attempting to produce music on a piano when the strings are not tightly drawn. Read some selections

now, first permitting the voice to strike the roof of the mouth far forward and then quite in the back part. Continue to repeat this until you can control the voice in this respect with ease. Remember that continuous practice makes perfection.

In this way, and by following directions previously given, a full, smooth, pure tone may be produced. Let this be done in various keys, from very low, to high, or very high.

When the learner can command himself in the above described efforts, let him try to form the orotund voice—that tone of voice which good speakers use with such effect when discoursing of the grand or the sublime; that tone of voice which the celebrated Dr. Rush described as “pure tone intensified.” This tone is formed by complying with the foregoing conditions, and directing the sounding breath into the pharynx, the chamber just back of the mouth. To do this, let there be an effort made as though one desired to send the voice out of the back of the head instead of out of the mouth.

For practice in the orotund quality of voice, good selections may be taken from the Psalms of David or from the Prophets. The “Apostrophe to Mount Blanc,” by Coleridge, is one of the best

pieces in the language to practise upon in this tone of voice. In this selection we will find the low orotund demanded in most of the directed addresses to the mountain, as when the author says:

“Hast thou a charm to stay?” &c.

A change should be made to the pure tone by directing the voice to the back of the mouth instead of into the back part of the pharynx when speaking of the “Arve and the Arveiron,” and then a return to the orotund when we come to the words:

“Whilst thou, dread mountain, form,” &c.

Thus the reader must change throughout the piece from the orotund voice to pure tone, and from pure tone to the orotund. At one or two places the high orotund will be demanded, as on the words:

“Wake, oh wake, and utter praise!”

This piece is to be found in many of the school readers. Milton's works also afford good examples for such practice, as do many of the published speeches of ancient and modern orators.

AN INTERESTING CASE.

In previous pages it was said, "Thousands are to-day enjoying good health, who, but for thorough vocal exercise, would have been in consumptives' graves."

A lady, forty years of age, to whom I have read the two previous lessons, informs me that I have not over-stated the benefits to be derived from such training. She said: "Those who faithfully follow your instructions will not only improve their health, but they will have better forms, better complexions, and, in many cases, better, because more regular, features." She then gave me her own experience.

Some fifteen years since she was an invalid, with no prospect of recovery. The upper part of her chest was narrow, measuring eleven inches from the point of one shoulder to that of the other, across the front of the chest. Her liver was enlarged, and pressed upon the lower part of lungs; her digestion was very imperfect, her skin sallow, and her extremities cold.

Some lady friends who had given this subject much attention, merely as a matter of health, prevailed upon her to change her mode of dress, so as to give perfect freedom to the organs of

the chest, and to spend a few minutes daily in inhaling and exhaling pure air, according to directions which they gave her.

As she lived in a city, she was to go to an upper room of her house, where the air was purer than in a lower storey, and there inhale and exhale thus:—Standing, as I directed in the first article, she was to inhale through the mouth, closing the lips so as to leave the least possible aperture, until the lungs were filled to their utmost capacity, when she was to close the lips, and exhale slowly through the nose. For a time she placed a quill between her lips, and inhaled through that, so as to prevent her from filling the lungs too rapidly. The weather was cold, and as she did this in an unwarmed hall, she was at first obliged to wear a thick coat while exercising.

The first effect was to excite a cough whenever she commenced the exercise; but by persevering she soon overcame this tendency. After a short time she found that the exercise gave her warmth, and in a few weeks she could warm her hands and feet by stepping into a cold place, where there was a pure atmosphere, and inhaling and exhaling as described.

The cause of this is obvious. The blood,

better oxygenised than formerly, was sent more freely through her arteries to every part of her system.

But more than this—within three months she measured fourteen inches across the upper part of the chest, where, when she commenced this exercise, she measured but eleven. The swollen liver had resumed its natural shape, so that at the waist she measured less than before. Her sallow complexion had become bright, and her dull eye sparkled. She had also grown very much better looking.

Her voice had greatly improved, and though she had given no other attention to it than that which was derived from this simple exercise, which she still continues, it is clear, pure, and strong, leaving the impression upon the hearer that she has at some time cultivated it with great care.

THIRD MONTH.

It now becomes necessary to practise upon the unobstructed vocal elements of speech, or upon those elements which are usually represented by the vowels.

The order of arranging the unobstructed vocals is as follows :—

FULL VOWELS.

1. *E*, as heard in *me*, *eel*.
2. *A*, ,, ,, *may*, *ale*.
3. *A*, ,, ,, *care*, *hair*.
4. *A*, ,, ,, *far*, *are*.
5. *A*, ,, ,, *saw*, *all*.
6. *O*, ,, ,, *no*, *own*.
7. *Co*, ,, ,, *noon*, *ooze*.

SHORT OR STOPPED VOWELS.

1. *I*, as heard in *tip*, *it*.
2. *E*, ,, ,, *pet*, *end*.
3. *A*, ,, ,, *back*, *at*.
4. *A*, ,, ,, *class*, *ask*.
5. *O*, ,, ,, *not*, *odd*.
6. *U*, ,, ,, *cut*, *up*.
7. *Oo*, ,, ,, *foot*, *hook*.

COMPOUND VOCALS.

1. *I*, as heard in *bind*, *isle*.
2. *Oi*, ,, ,,- *boy*, *oil*.
3. *Ou*, ,, ,, *thou*, *out*.
4. *U*, ,, ,, *new*, *tune*.

Before commencing to practise upon these vocals, unaccompanied by other sounds, let the

words that are used to illustrate these sounds be pronounced again and again, until the ear fully recognises the sounds that are represented by the italicised letters in those words. There is more need of attention to this than is generally believed. There are sections of our country where there are few who do not confound the fourth full vowel with the fifth; few who would not pronounce the first syllable of garden and Gordon alike. In like manner, the fourth stopped vowel is confounded with the third; while both are pronounced so nearly like the third vowel that one does not know, except by the context, what words are used. And even the first, second, and sixth full vowels are often used so carelessly that it is with difficulty the best ears can be sure what words the speaker intends to pronounce. I know persons who so confound the sixth full with the sixth stopped vowel as to leave an uncertainty as to the word spoken. Even if our words are understood we pain every cultivated ear around us by such slovenly pronunciation.

Having accomplished this, let these sounds be expressed singly and in an affirmative voice, as though replying to a question, "What did you say?" Repeat each sound several times, say

three times, in pure tone and three times in the orotund quality of voice. Let each repetition be a little more forcible than that which preceded it, as would be the case if the question given were repeated.

If the reader believes he is not accustomed to enunciating elemental sounds singly, I would say that he does thus enunciate the fifth full vocal every time he pronounces the word *awe*, and the sixth whenever he speaks the word *owe*, and the first compound vocal each time he pronounces the word *eye*.

In practising upon the short vocals it should be remembered that they must be enunciated in a very brief space of time. They are never prolonged in words that are properly pronounced, and when practised upon singly they should receive no more time than they do in words.

Now introduce some short, pithy sentence, as "Rise, father, rise; 'tis Rome demands your help!" and read it with force and energy. Having read it several times as directed, read it, enunciating the vocals only, or the sounds represented by the italicised letters, as follow :

"Rise, father, rise; 'tis Rome demands your help!"

The following example of stopped vocals is

brought under emphasis. It should be read first by pronouncing the words and afterwards by enunciating the vocals, which are again represented by italicised letters :

“Back to thy punishment, false *fugitive* !”

Select many such passages and read in this manner.

By no means let these exercises supersede those already recommended, but continue to practise them daily, and add all those given in this lesson. If the patient or pupil enters into this practice with enthusiasm, and tries to do everything perfectly, he will find great pleasure in his work. If he cannot or will not do this, little good will result.

FOURTH MONTH.

It is but right to presume that the reader understands the terms, “pitch” and “force,” and that the terms, “high” and “low,” “loud” and “soft” need no explanation.

We have two modes in speech of changing the pitch of the voice, viz., by skipping from one key to another, and by sliding from one to another. Every one makes use of both these modes when-

ever he talks, though some find it easier to make these changes than others. If we observe any two persons while conversing we may readily notice a difference in this respect ; and if we will observe two persons, one of whom is pleasing in his mode of speech and the other not, we will see that no small amount of this difference comes from the ease and freedom with which one changes his key by means of skips and slides, and the entire want of this ease and freedom on the part of the other. We may also observe that the former has a greater range in these changes, or more " compass of voice " than the latter.

In the manner of effecting these changes, we can improve by proper effort and training. Those who seem to be almost perfect in the use of their voices can be brought nearer to perfection, while those who are farthest from perfection can be rendered less imperfect by careful culture.

For the purpose of securing this culture, let the exercises recommended in the last lesson be repeated upon every key within the compass of the voice, from the lowest to the highest. Do this by commencing on the medium key, of your own voice, which may differ from that of every other, and vary from that up and down the scale. Do this upon all the vocals represented there,

upon all the sentences given, and upon other chosen sentences.

Again, skip from the very highest key, at once, to the very lowest, and from the lowest to the highest. In like manner, skip from the middle key upward and downward and back to the middle key, until any key within the range of the voice can be taken at will and without difficulty, and until the compass of the voice is materially increased.

Now let us attend to the "slides," which are changes of the voice upward or downward during the utterance of a single sound, or of a series of blending sounds, which form a syllable. These are made upon the violin by slipping the finger along the string, at the same time the bow is drawn across it.

In the proper utterance of the sentence, "As soon as I arrived he conducted me to his home," it will be observed that there is a slight upward slide on the word "I" an upward slide of the "second." Repeat this sentence a few times, until the ear can distinguish and the voice execute that slide in the sentence; then pronounce the word "I" by itself with the same slide.

Now try to enunciate "e" with the same slide. If any doubt occurs as to accuracy, repeat the

sentence; "As soon as 'e' arrived, he conducted me to his home, and compare the different utterances until accuracy is secured.

In this way proceed with all the unobstructed vocals as represented in the last article, until any of them can be enunciated with an upward slide of the "second."

Now take another sentence as, "It is I, be not afraid," and repeat without any emotion, noticing the downward slide on the word "I," which will be the "downward slide" of the "second," if thus delivered. Practise upon this, as before directed, until the word "I" can be enunciated with a downward second. In like manner introduce and practise upon all the vocals, until each can be enunciated with this slide.

Now, without any emotion, ask the question, "Did you say 'e'?" and reply by saying, "Yes, I said 'e.'" If done as directed it will be seen that in the question the upward second is given, and in the reply the downward second is given. Having thus trained the ear and the voice in these two sentences, enunciate "e," first with the rising and then with the falling second.

In this way practise upon all the unobstructed vocals, until the "upward and downward second," thus brought in contact, are familiar to the ear, and easily produced by the voice.

Repeat the last question and answer with earnestness, and the vocals will be enunciated with an upward and a downward third.

Let the question be asked with surprise and the reply given with corresponding earnestness ; and the result will be slides of the fifth.

If the question be now asked so as to express astonishment, and the reply be given with a degree of earnestness that shall correspond, the result will be slides of an octave.

The directions given for practice on the second will apply to the longer slides. They should be practised upon with faithfulness.

Having thus trained the ear and voice, we can find examples in books that are always at hand. No better works can be found for this purpose than Shakespeare's ; but all of our standard writers abound in good examples, and the selections in our school reading books also furnish them.

Some whose ears are naturally acute in determining the quality of a sound may think that too much effort has been made to make this subject plain ; but the writer, only the day before this was written, found, as he has often before found, in a class of fifty, that not one-half of them could tell whether a slide was upward or downward

when a slide of only a second was made, and many of them hesitated as to the direction when a slide of a third was made.

Again, assuming that "force" is a term that needs no explanation, I will proceed to give directions for cultivating the voice, to give different degrees of force at will. But first let me say, that while most people know and can explain the difference between "force" and "pitch" practically, we very often confound the two. The mother tells her child to speak "louder," which should be understood to mean, "speak with more 'force,'" and the child speaks on a higher key, either with or without increasing the force. The mother accepts this effort to obey, and the child supposes that it has obeyed. At school, the same thing occurs daily, with this addition, that the teacher constantly sets the example of using a high key, without making any effort to use a proper degree of "force." Thus, a high key is so generally used when force should be applied that, notwithstanding our correct theories we have little correct practice.

When this practice is read before the reader, it is to be hoped that the weather will be so pleasant that the fields, groves and forests will be drawing us, irresistibly, to taste their delights;

or that those of us who are pent up in cities, and must resist the attraction of the country, will be drawn to parks or out on the water, for it is in such places that I must now ask my readers to practise. If this is also impracticable, a very large room is desirable. Hoping that most of those who require these exercises can go into "God's first temple" for practice, I will attempt to suggest the best methods of exercising.

Ask a friend to accompany you to some place out of doors, suitable for practice, each taking a copy of an interesting book. If you can keep up a conversation you will not, at first, need the books.

Let us suppose that a conversation can be kept up. Having reached the spot selected, commence a conversation on the middle key. Immediately begin to recede from each other, until you are at as great a distance apart as you can be and make yourselves heard with ease on that key. Now continue to increase the distance between yourselves, but be sure not to elevate the pitch of the voice. This will compel you to increase their force. Continue this, increasing the distance as you are able, until there is some fatigue, when it will be well to rest.

If subjects for conversation do not offer, use

the books, in which case it will be well to alternate in reading. The criticisms that may be made will furnish topics for conversation at intervals, thus giving variety to the exercises.

When this is accomplished, take a key below, and then one above the middle key, and practise in the same manner.

At times it is desirable to do this where the land is level ; at other times where it is undulating or hilly. On hilly lands, at one time let one of the parties be at the foot of the hill and the other as far up the hill as practicable. At other times places may be taken so that there will be a valley between the speakers. At times a stream of water may be between the two ; at other times one of the persons may be on the water and the other on the shore ; and, again, both may be in boats on the water. In short, vary the relative positions of the two speakers as much as possible.

Do not overdo, and do not leave any means untried to increase the power of the voice. But that this power may be effective there must be also an ability to use soft tones as well as loud ones. For this purpose, while thus increasing the power of the voice, there should be practice upon the tones that are, or should be, used in the room where there are sick persons ; not those

semi-whispers that are always so annoying to the sick and the well, but pure tone in its softest utterances.

If the reader resides in a seaport town, let him observe the manner in which officers of vessels issue their commands to men aloft, and the manner in which the responses are uttered, and, especially the way in which men are addressed who are on board another vessel, or at a distance, in a boat. In such cases, we will not only hear a due degree of "force," without hearing an offensively high key; but we will, if observant, notice that their words appear to be thrown far away from them, while ours often seem to drop at our feet.

Having secured the ability to use "force," as above, apply it to the elementary sounds.

Never give up until "low" and "soft" can be changed into "low" and "loud," and "high" and "loud" into "high" and "soft," and *vice versa*.

FIFTH MONTH.

If the directions given in the last exercise have been followed, there must now be new witnesses who will affirm that such exercises do strengthen both voice and lungs. How invigorating to go

into the open air and use the organs of speech as there directed ! Though it costs trouble, yet how it abundantly repays that trouble in every fibre of the system.

“Force” may be applied in various ways—that is, it may be applied to entire sentences, to words or to syllables. In applying it to syllables, it may be applied at the commencement, in the middle, or the conclusion of the syllable ; or it may be applied at the commencement and at the conclusion of the same syllable ; or from the commencement to the conclusion of a syllable.

The application of “force” to syllables or to single sounds is called “stress.” The application of “force” at the commencement of a sound is called “radical” or “initial stress ;” in the middle, “median stress ;” at the conclusion, “vanishing” or “final stress ;” at the beginning and at the conclusion, “compound stress ;” and from the commencement to the close, “thorough stress.” Either of the above forms of “stress” may be accompanied by a tremor of the voice, produced by joy, grief, anger, &c., or by feebleness, to which the name of “intermittent stress” is given.

“Radical stress” is used in expressing strong, manly passion, and generally, though not always,

in giving command. It is the governing "stress" in argument and in earnest narrative. It is more or less abrupt, as circumstances demand. To give this form of "stress" with ease and accuracy often requires much patient practice.

To produce the "radical stress" the lungs should be filled as directed in the first lesson devoted to these exercises. Having filled them, let the breath be barred up in the throat as it is just before we cough, and then enunciate with the abruptness of a cough.

To study this occlusion, or barring up, of the breath, take the word "awe," and having filled the lungs, utter the word with a coughing, vocal utterance. Do not do this with force enough to irritate the throat, but do it mildly and deliberately, and watch the movements of the throat with care. Again, do the same with a whispered cough.

Having thus studied the positions of the organs of the throat, fill the lungs, deliberately place the organs of the throat for the occlusion of the breath, nearly in the position they were held when preparing for the utterance of the word "awe," and then, with an abrupt action of all the organs of speech, speak the word with explosive force on the first part of the sound—

for there is but one sound in the word—and a gradual diminishing of the “force” until the sound dies away on the ear. Take the word “owe,” and practise upon it in the same manner. Now take the word “eye,” and do the same with that. Then practise upon all the full and stopped vocals, remembering that the stopped or short vocals have no “vanish,” that they are stopped almost as abruptly as they are commenced.

Read the following sentence :

“ Rouse, ye Romans ! Rouse, ye slaves ! ”

giving the “radical stress” to the vocals in the words printed in italics.

Read that sentence by the vocals, as directed in previous articles, giving the “radical stress” to them.

Practise upon the following sentence in the same way :

“ Fret till your proud heart breaks ! ”

Take other sentences, and practise upon them in the same manner.

It will be noticed that the “radical stress” is placed upon the unobstructed vocals, and for that reason it is easier to place the “stress” on words or syllables that commence with these sounds than upon words that commence with

obstructed vocals or with aspirates ; but practice will enable us to place it on syllables, however they may commence.

The learner is urged to be content with nothing short of complete success.

The “median stress” very nearly corresponds to the “swell” in music. It is used for the expression of grand or sublime thoughts.

To master this “stress,” practise upon all the full vocals thus: Having filled the lungs as before, commence the utterance of any one of them in a soft voice, gradually increasing the “force” until the middle of the sound is reached, and then as gradually diminishing the “force” until the close of the sound. The stopped vocals do not admit of the “median stress” in this utterance.

Now we may take examples for reading. They are to be found in abundance in the Psalms of David and, in fact, all through the Bible.

David’s lamentation over Saul and Jonathan affords a very fine example, as :—

“How are the mighty fallen! Saul and Jonathan, lovely and pleasant in their lives,” &c.

From the Book of Psalms :—

“Oh! sing unto the Lord a new song, for he hath done marvellous things,” &c.

The poets give us examples without number. Bryant's "Forest Hymn" may be referred to:—

"Father, Thy hand
Hath reared these venerable columns ; Thou
Didst weave these verdant roofs," &c.

Practise upon "median stress" until it is your own, and then read the following passages and similar ones as we often hear them read from the pulpit and with the family, and with "radical stress" and then as they should be, with the "median stress" upon most of the emphatic words, and note the difference in the effect:—

"Woe unto thee, Chorazin ! Woe unto thee, Bethsaida ! for if the mighty works had been in Tyre and Sidon, which had been done in you, they had a great while ago repented, sitting in sackcloth and ashes."

SIXTH MONTH.

It was said in the last lesson that when "force" is applied at the conclusion of the sound, the "stress" is called "vanishing" or "final stress."

The "vanishing stress" is used for the expression of defiance, indignation, complaint, coupled with determined purpose or firm resolve ; also

for expressing peevishness, alarm and kindred emotions.

As the "radical stress" requires the natural movement of coughing for its production, so to produce the "vanishing stress" requires the natural movement for sneezing. To obtain an idea of this stress take the following passage from Webster, and read it with earnestness and spirited resolve :—

"On such occasions, I will place myself on the extreme boundary of my right, and bid defiance to the arm that would push me from it."

Read and re-read that passage. It will be observed that the "force" on all the important syllables is moderate in the commencement, and that it increases to the close, where it is stronger than at any other point ; or, when that is not practicable, the force is then increased through the vocal element of the syllable. Train the voice and the ear by thus repeating this and similar passages for a time, and then take the vocal elements of the language and practise upon them separately. It will often be well to exaggerate this stress upon the vocals, as it is a more difficult form of stress to master than either of the forms treated of in the preceding article. As

in other undertakings, perseverance will enable any one to overcome these difficulties.

Many passages should be taken for practice, for which the reader is referred to the books. Shylock claiming his bond, and refusing to listen to Antonio, in the word, "I will have my bond; I will not hear thee speak," &c., is an excellent example.

Here is a good example: "You may, if it be God's will, gain our barren and rugged mountain; but, like our ancestors of old, we will seek refuge in wilder and more distant solitudes; and when we have resisted to the last, we will starve in the icy wastes of the glaciers! Ay! men, women, and children, we will be frozen into annihilation together ere our free Switzer will acknowledge a foreign master!"

The "compound stress," or stress in which the force is applied in the commencement and at the conclusion of the sound or syllable, while the middle receives but little, thus combining the radical and the vanishing stress, on one sound or syllable, is used for the expression of surprise, perplexity, alarm, contempt, mockery, &c.

This familiar line, from Byron's "Battle of Waterloo," furnishes a good example:—

“Arm, arm, it is—it is—the cannon’s opening roar!”

If this is read with the “radical stress” it becomes a firm command; if with the “vanishing stress,” it would indicate impatience; but if with the two combined, forming the “compound stress,” there will be an impression of surprise or alarm, or both, coupled with a command or an earnest entreaty, as the case may be.

Shakespeare and Milton furnish examples without stint for the expression of this kind of stress. The reader may find them for himself.

“Thorough stress,” or stress applied from the commencement to the end of the sounds, is used for the expression of vehement emotion of many kinds, as of joy, triumph, lofty command, sustained call, &c.

The opening sound in the thorough stress is not quite as abrupt as in the radical stress, and the closing sound is less abrupt than in the vanishing stress; but the degree of force demanded at the opening is sustained throughout the entire sound.

A fine example is to be found in “Milton’s *Paradise Lost*,” where the Arch Demon calls to his fellows:

“Princes ! Potentates !
Warriors, the flowers of Heaven, once yours, now
lost,
If such astonishment as this can seize
Eternal Spirits,
Awake ! arise ! or be forever fallen !”

Here is one from Pope :

“Lend, lend your wings ! I mount, I fly !
O death ! where is thy sting ?
O grave ! where is thy victory ?”

When the emotions carry us to such an extent as to weaken or exhaust us—whether these emotions are those of joy, grief, or pathos—or when we are overpowered by the sublimity of our thoughts, or when we are enfeebled, by age or disease, our voices often assume a tremulous movement—we utter our words in a tremor, or with the “intermittent stress.” The intermittent stress may combine with any of the other forms.

These familiar lines :

“Pity the sorrows of a poor old man,
Whose trembling limbs have borne him to your
door ;
Whose days are dwindled to the shortest span !
Oh ! give relief, and Heaven will bless your store !”

when properly uttered, are pronounced with the intermittent stress, with the tremor of age.

Reading Bryant's "Hymn to the Stars," if to the median stress the intermittent be added at times, the exultation will be more strongly expressed; or, rather, if we so fully enter into the feelings of the writer as to cause the voice to become slightly tremulous, it will bring out the spirit of exultation very much better.

In order that the voice may easily give forth these tremulous sounds, it must be disciplined, except in a few cases where there is naturally great flexibility of the vocal organs.

To discipline a voice, here, as elsewhere, there must be practice—practice upon elementary sounds, practice upon short passages, practice upon paragraphs, practice in small rooms, practice in large rooms, practice in the open air—practice, PRACTICE, PRACTICE, in season and out of season.

SEVENTH MONTH.

We may have strong voices, we may have melodious voices, without being able to articulate distinctly. By some, articulation is considered so important as to be placed first in the order of instruction. We have not placed it last because

we consider it of less importance than the other subjects treated, but because we believe the reader will better understand and apply the instruction after having mastered the subjects that have been presented first.

If we pronounce the words "rope" and "robe" we shall have pronounced two words that are alike in two of the three sounds of which each is composed, and whose final sounds are nearly alike, the chief difference being that the final sound of "robe" is whispered, while the final sound of "rope" is spoken or "voiced." Since that is all the difference between the two words, it must be evident that it is of the utmost importance that this distinction should be clearly defined by the organs of speech.

The words "pin" and "bin" differ only in the initial sounds. The words, "right," "write," or "rite," and "ride," "tin," and "din," "rich" and "ridge," "chin" and "gin," "rick" and "rig," "Cain" and "gain" are just as nearly related. In each pair of words the difference is that a sound in one word is whispered, while in the other, a sound, similarly placed, is spoken. In order that speeches may be understood, it is necessary that this slight distinction shall be well marked. Elegance of speech demands the same

thing. Not only should a speaker be understood by those near him, but he should be understood by all within the reach of his voice, be they few or many. Our best speakers are thus understood. But this elegance and accuracy of articulation come, except in rare cases, only by very careful training.

To secure this training, it is essential that we practise upon all the articulated sounds singly, as well as in combination. Many find it difficult to do this. It may be done with comparative ease.

Pronounce the word "rope" several times with care, bringing out each sound fully. Now pronounce it as represented to the eye, thus: "ro-pe," with a pause after the first two sounds, and then a finishing of the word by enunciating the final sound, remembering that the final "e" is silent. Repeat this until it is easy to do it. Now enunciate the last sound by itself, the sound represented by "p."

Pronounce the word "robe" several times, giving fullness and distinctiveness to each sound. Now separate it, thus: "ro-be." Let the final sound be full and deep. Learn to prolong it without a drawl. Now practise upon the sound represented by "b" separately. Do not give up until you can enunciate it with accuracy of arti-

ulation, and depth and purity of tone. Take other words ending in the two sounds under consideration, as cup, cub; rip, rib; and practise upon them in the same manner.

Now take words commencing with those sounds, as, pay, bay; pie, buy; peach, beach; and pronounce them in pairs, with great care, a few times, after which enunciate the initial sounds in pairs, as, "p, b," giving the sounds as heard in the words, and not the names of the letters.

In like manner, practise upon the words and upon the sounds represented by the italicised letters in the following :

Write	Ride,	<i>File,</i>	<i>Vile,</i>
Cut,	Cud,	<i>Withe,</i>	<i>With,</i>
<i>Tin,</i>	<i>Din,</i>	<i>Wreath,</i>	<i>Wreathe,</i>
<i>Time,</i>	<i>Dime,</i>	<i>Thigh,</i>	<i>Thy,</i>
Rich,	Ridge,	<i>Thin,</i>	<i>Then,</i>
Batch,	Badge,	Hiss,	His,
<i>Chin,</i>	<i>Gin,</i>	Sauce,	Saws,
Choose,	Jews,	Seal,	Zeal,
Rick,	Rig,	Soar,	Zoar,
Back,	Bag,	Rush,	Rouge,
Cain,	Gain,	Vicious,	Vision,
Cull,	Gull,	Sure,	Jour,
Duff,	Dore,	<i>When,</i>	<i>Wen,</i>
Safe,	Save,	<i>Which,</i>	<i>Witch,</i>
<i>Fine,</i>	<i>Vine.</i>		

This completes the list of cognate sounds in our language. The following have their cognates in other languages :

<i>Fall,</i>	<i>Lull,</i>	<i>Sing,</i>	<i>Rang,</i>
<i>Car,</i>	<i>Roar,</i>	<i>Yea,</i>	<i>Yacht,</i>
<i>Sum,</i>	<i>Maim,</i>	<i>Hat,</i>	<i>High,</i>
<i>One,</i>	<i>Nun.</i>		

The practice here recommended will not only secure correct articulation, but it will give smoothness to the voice.

The student will now need to practise upon difficult combinations of sounds, as “bd,” in “rob’d,” “rub’d,” and “vdst” in “lov’dst,” &c.

For lists of words containing such combinations the pupil is referred to his own ingenuity, or to school-books.

The broad field of elocution still lies before us untouched by these articles, and ready for exploration. The culture of the voice is the basis upon which to build that great structure. To erect that structure is worth the study of a lifetime. Cultivate the powers of expression! From their culture we may derive pleasure during nearly every waking hour of our lives, either in our conversation or in more public modes of using the organs of speech. Let us

not think, for a moment, that because we do not expect to become a Webster we do not need elocutionary training. We might as well say that because we do not expect to become expert gymnasts we do not need healthy, well-toned, flexible muscles. Few, if any of us, expect to display our muscular ability before audiences ; yet none of us can afford to pass our lives without that discipline of our bodies that shall make them erect, well formed and flexible. Few of us expect to thrill assembled thousands with our eloquence ; yet none of us can afford to be without that discipline of our voices that shall render them strong, pure-toned, flexible and melodious, and make our conversation and our reading agreeable and even delightful to all who listen.

CHAPTER VIII.

SCIENTIFIC PHYSICAL CULTURE.

As a means of preventing and curing consumption, I wish now to speak of scientific physical culture, the object of which is to produce, as nearly as possible, the ideal man and woman. They are rarely real persons. Now and then one so nearly approaches perfection, from the physical point of view, that we may consider him as a model. In a rude way, our ideal man is the average person made by taking the anthropometric measurements of many thousand normal ones at a certain age. He has such a height, such a length of limb, measurement around chest, waist, arms, legs, &c. ; a pulse of a certain number of beats per minute, and so many inspirations and expirations in the same time. It is very doubtful if this method of finding out what development an ideal man should have is the best that can be devised. The average of a thousand

persons may not be the best model of physical development, but far below it; besides, we should need studies for each temperament and each race to guide us in forming an opinion. The measurements of a man with the motive temperament predominating should not be mixed with one of the nervous or vital, and so on, for this would vitiate the results and render them less useful. Still, some good comes from the anthropometric measurements, and we have a standard, such as it is, a unit from which to measure ourselves. With it we may take one whose physical development is defective and find out what these imperfections are. When we know them we have at once in our hands the basis for a knowledge by which we may correct them. In one disposed to consumption the measurements will be under the average, and very far below one with superior measurements. He will be smaller around the chest and waist; the arms and limbs will be of less circumference; there will be a tendency to flatness over the breast, and the back of the neck will be thin instead of round. The digestive organs will be deficient, the muscles rather flabby and the *tone* low. With these points in view, what remedy has scientific physical culture to offer?

It should pursue a purely educational course designed to restore the body to a normal type. It should go to no extremes, but always be kept within the capacity of the person trained. Nothing should be overdone. The first thing often to consider is the food, which should always be of the most suitable kind, with rather more fatty and hydrocarbonaceous matter than would otherwise be necessary. The health and strength of the digestive organs should be promoted. Often it will be well to devote the first part of the training to them. Massage, and especially percussion over the stomach, abdomen, liver, sides, and back, so as to call the blood to these parts, will be very valuable. Thus digestion will be improved, more food digested and assimilated, and the blood become richer and better.

In addition to this, every effort should be made to enlarge and strengthen those parts of the body which are below the standard of the ideal man. It may not be possible to bring them up to this standard, but we may approach it. If we can bring them to a degree of strength which will enable them to resist disease, we may be satisfied. The chest should be developed first. Our modern methods of physical culture

are such that any muscle or set of muscles and other organs may, by their use, be brought up to a very considerable degree of perfection. The chest may often be enlarged several inches in a comparatively short time by respiratory and chest gymnastics. It is not wise, however, to try to build up great muscles over this part, but rather to enlarge the lungs and to promote flexibility and ease of movement of all the organs.

The enormous increase of muscular development is a fatal error with some who engage in physical culture. Plato understood this, and advised against it. The Grecian athletes, according to him, were short-lived and unhealthy. His idea of physical culture was a training to produce harmony of development and moderate strength, with ease and grace of movement. Modern teachers may profit by his wisdom.

After having done for the chest what seems sufficient, any other part of the body may be brought as near as can be to a normal standard, or the work may proceed at the same time until all has been done that can be done. This is accomplished better in early life than later; but even after maturity, and when one is far advanced in life, it is not too late to do much,

especially in improving the digestive organs and the chest. This physical culture, when rightly done, reacts on the nervous centres, and promotes their health. If it did not, little good would result, for they are often the source of imperfect bodily development and feeble respiration and circulation.

The work of scientific physical culture is best done in special schools for this purpose. If one wishes to become a musician, he goes to a musical instructor for training. He undergoes the most severe exercise of the voice and all the organs which produce it in song; or, if he desires to become a violinist or pianist, the special training required by teachers on those instruments. By this means the musical talent, which lies in embryo in the nature of the pupil, is brought out, strengthened, perfected; so should it be in perfecting a physical organism. The person should go to one who has the best knowledge of how to perfect it, and take the training required. The musician keeps up his practice after the teacher has imparted to him all the instruction necessary; so must the one who has received physical training. The time required daily is small, and the benefits incalculable.

Nearly every college and university now has its well-equipped gymnasium, with its Professor of Physical Culture, and these offer most of the advantages required for that scientific physical training which is necessary to prevent consumption, and this object may be secured at the same time that the mind is being educated.

CHAPTER IX.

HORSEBACK EXERCISE.

RIDING on horse-back is a method of taking exercise which has been extolled in former times as a cure for consumption ; and it has cured very many cases, not only of this disease, but of others. While it may not be adapted to all individuals, or to all stages of the disease, it will be to many. Among others, the following advantages may be named:—

1. It takes the patient out of doors. That this is desirable cannot be doubted.

2. It furnishes a gentle but effective motion, well suited to many who are not able or willing to take other forms of physical culture—a motion which gives an agreeable and constant agitation to the digestive track, including the stomach, liver, and the entire intestines. This, in a very marked manner, promotes the circulation in these organs and improves nutrition, the importance of

which cannot be over-estimated, for the cure of this disease depends as much upon improving nutrition as on any other single means, and the constant endeavour of physicians to induce their patients to take abundant food is often a source of evil unless, at the same time, something is done to promote those changes effected by the stomach, called digestion. It is an old adage, that it is not the food eaten, but the food assimilated that gives strength, and this applies to the cases under consideration.

3. Horseback riding also promotes gentle, but increased respiration, thus bringing into the lungs more air with its oxygen, and, at the same time, during expiration, carrying off much more carbonic acid and other still more poisonous products of waste which, if left in the blood, act as poisons to the nervous system as well as depressingly on all the bodily functions. Dr. Edward Smith made some experiments to discover the difference in the amount of carbonic acid carried away from the lungs when a person was undergoing different forms of exercise. Taking the lying down position as a unit, and calling it 1, he found that when riding on a horse, on a trot, it became 4.5, or four and one-half times as much as when lying down. No doubt the other pro-

ducts of respiration were increased in an equal ratio, and also the amount of oxygen taken up by the blood. These facts alone are sufficient to explain the benefit this kind of exercise produces on the appetite and on the digestion. It may be asked if the same results may not be obtained by other forms of movement, to which I answer, that the increase of respiration produced by horseback riding is accomplished without very much effort, when the same result produced by walking would be wearisome, and tire the patient more than would be good for him. Indeed, walking four miles an hour would not cause more exhalation of carbonic acid than horseback riding as above described, and yet how short a time could this be borne. It is true that riding on the trot would not be advisable in all cases, or, perhaps, in any. A good walking or pacing gait would be better, or a gentle gallop now and then for the sake of variety.

4. Another and final advantage of horseback riding is the psychical effect, or the effect on the mind. The patient often becomes devotedly attached to his horse. The animal becomes his companion, his friend. It takes his attention from himself and transfers it to an object. To this is added the constant change of place and of

scene. These two advantages would be quite sufficient if there were no other. To be tied down to one's room or house day after day is itself an evil which always aggravates the disease, as we all know. If by any means the patient can take a few hours out of doors daily he will return to his home and enjoy its comforts far more than if compelled to remain there day after day without change.

It may be asked if there are any cases on record which show that horseback exercise has ever produced any results worthy of notice. I will give a few instances.

The first is that of a wealthy Englishman who was declared by his physician to be in the first stages of consumption. "Well," said he, "I will die game." Having horses and dogs and leisure, he refused to take medical treatment, or even have his lungs examined again, but lived as many hours daily in the saddle as he could, hunting and riding in all weathers, defying cold and heat alike. He was also particular to avoid heated rooms, late dinners and parties, and lived in all respects rationally. He would not talk about his disease, or even admit that his lungs were not sound and strong; no one was permitted to speak of them in his presence. With this method

carried out, he lived on in very good health to a fair old age, with no symptoms of his trouble. Well protected by suitable clothing, he often spent nearly the whole day in the saddle, and came home with a good appetite, which he did not abuse by over-eating, and made his family and friends happy by his cheerfulness and joyousness, rather than a cause of care and anxiety on account of his infirmity. I know perfectly well that not every one is so fortunately circumstanced as he was ; but this case illustrates what I desired to prove, the value of horseback riding and a life in the open air for diseases of the lungs.

Dr. Rush, in an essay on *The Cure of Pulmonary Consumption*, published in the last part of the seventeenth century, says on this subject: "To the cases that have been mentioned, I shall add only one more, which was communicated to me by the venerable Dr. Franklin, whose conversation at all times conveyed instruction, and not less in medicine than upon other subjects. In travelling, many years ago, the doctor overtook the post-rider, and after some inquiries into the history of his life, he informed him that he was bred a shoemaker ; that his confinement, and other circumstances, had brought on a consump-

tion, for which he was ordered by a physician to ride horseback. Finding this mode of exercise too expensive, he made interest, upon the death of an old post-rider, to succeed to his appointment, in which he perfectly recovered his health in two years. After this he returned to his old trade, upon which his consumption returned. He again mounted his horse, and rode post in all seasons and weathers, between New York and the Connecticut River (about 140 miles), in which employment he continued upwards of thirty years in good health."

The same author continues : " Dr. Sydenham pronounced riding on horseback to be a certain cure for consumption as bark is for an intermitting fever. I have no more doubt of the truth of this assertion than I have that inflammatory fevers are now less frequent in London than they were in the time of Dr. Sydenham. If riding on horseback for consumption has ceased to be a remedy in Britain, the fault is in the patient, and not in the remedy. The inability of the patient to bear this manly and wholesome exercise, serves only to demonstrate the necessity and advantages of it. I suspect that the same objections to this exercise which have been made in Britain will not occur in the

United States of America; for the Americans, with respect to the symptoms and degrees of epidemic and chronic diseases, appear to be nearly in the same state that the inhabitants of England were in the seventeenth century. We find, in proportion to the decline of the vigour of the body, that many occasional causes produce fever and inflammation, which would not have done so a hundred years ago."

In an almost forgotten but charming book, entitled "Out-door Papers at Idlewild," by N. P. Willis, may be found additional confirmation of the value of horseback riding. Mr. Willis had tried ineffectually the climate cure for his disease without beneficial results. Returning home, he abandoned all irregularities of life and habits, attended carefully to his food, his sleep, his clothing and other little things too often neglected by the invalid. In writing of it he says: "And, to a minutely persevering change in these comparative trifles I owe, I believe, my restoration to health. There was not a day of the succeeding winter, however cold or wet, in which I did not ride eight or ten miles on horseback. With five or six men I was for most of the remaining hours of the day out of doors, labouring at the roads and

clearing of my present home. The cottage of Idlewild was then unbuilt, and the neighbouring farm-house, where we boarded, was, of course, indifferently warmed ; but, by suffering no state of the thermometer to interrupt the morning cold bath, and the previous friction with flesh-brushes, which makes the water as agreeable as in summer, I soon became comparatively independent of the temperature indoors, as my horse and axe made me independent of it when out of doors. With proper clothing to resist wet or cold, I found, to my surprise, that there was no such thing as disagreeable weather to be felt in the saddle ; and when a drive in a waggon or carriage would have intolerably irritated my cough, I could be all day in the woods with an axe, my lungs as quiet as a child's.

“ I fear I cannot sufficiently convey to you my sense of the importance of a horse to an invalid, In my well-weighed opinion, ten miles a day in the saddle would cure more desperate cases, particularly of consumption, than all the changes of climate and all the medicines in the world. It is vigorous exercise without fatigue. The peculiar motion effectually prevents all irritation of cold air to the lungs, on the wintriest day. The torpid liver and other internal organs are more

shaken up and vivified by the trot of a mile than by a week of feeble walking. The horse (and you should own and love him) is company enough, and not too much. Your spirits are irresistibly enlivened by the change of movement and the control of the animal. Your sense of strength and activity (in which lies half the self-confidence as to getting well, which the doctors think so important) is plus one horse, with the difference from walking. As to pulling upon the forces of the spine and, consequently, those of the brain, it is recommended by the best English physicians as much the preferable exercise for men of intellectual pursuits. And last (I think not least), the lungs of both body and soul are expanded by the daily consciousness of inhabiting a large space—by having an eagle's range rather than a snail's—by living a life that occupies ten miles square of the earth's surface, rather than that 'half mile' which you speak of as the extent of your daily walk. The cost is trifling. At the fall of the year, when horses are beginning, as they say at the livery stable, to 'eat their heads off,' you may buy the best you may want for forty dollars, and his feed costs thirty cents a day. As the horse and the doctor are seldom necessities of one and the same man,

you may rather find it an economy—apothecary and all.”

To this is added from the same book one more ease. The writer, in a letter to Mr. Willis, says: “I am induced to tell my story. I have been on the invalid list for twenty-five years. In October, 1834, by the advice of my physician, I prepared to move to St. Augustine, Florida. All things were ready; my strength was not sufficient to leave for a few days. A friend had just been elected sheriff of the county; he offered me a situation where I could spend as much time as I chose on horseback. I accepted the offer. The first six months were spent in great agony; but I found my strength improving. It is now nineteen years since I commenced the horseback remedy for tubercular consumption. In that time I have travelled on horseback many thousands of miles. I have now my business so arranged that I am compelled to ride sixteen miles each day. I allow no state of the weather to interfere with the rides, as I am always prepared with proper clothing to resist cold or wet. My health is now good; perhaps no man enjoys better health. My disease was and is tubercular consumption. I have no reason to think that the tubercles in my lungs will ever be dispersed;

but I do know that they can be kept in a quiescent state in the open air. With this in view, I shall continue the use of the saddle, in the open air, whilst I have strength to do it."

Reading these papers to a friend, he remarked that he had known many persons with the disease we are considering, in varied degrees of progress, and, mounting a horse, go to a ranch and live in the saddle during the day for months, sleeping at night in tents or huts, where the air was fresh and pure, and to recover. One case he mentioned of a man, who for the first week had to be helped on to his horse, so weakened had he become; but, in a few months, he could ride with others all the day without more fatigue than such exercise naturally produces, at which time he considered himself as cured.

CHAPTER X.

TOUGHENING THE CONSTITUTION.

As has already been intimated, the constitutions of those most inclined to consumption are generally delicate ones. From this I do not mean to infer that none others ever have this disease. If the causes be sufficiently active and prolonged, those of excellent constitutions may fall a prey to it; but, notwithstanding this, it is usually those who are not strong. What is meant by the constitution? We call it a state of being, a condition of the body and its organs as related to health, strength, elasticity, force, &c. We say a constitution is strong when all these characteristics exist in a high degree; weak, when in a low degree; and, fair, when neither high nor low.

We say, sometimes, a person has a powerful, a vigorous, a wonderful constitution. Such are millionaires of good health. They endure every-

thing. Nothing seems to hurt them. They hardly need to take care of their health. Such persons are described by Emerson when he says: "But health or fulness answers its own ends and has to spare, runs over and inundates the creeks of other men's necessities."

Not so with the man with a poor constitution. As to health, he is a bankrupt, a pauper. He cannot "enter cordially in the game and whirl with the whirling world." He must remain a bystander; must husband his resources to live.

We must not confound the constitution with the temperament. They are very different. The constitution relates to the stored-up energy of the body; the temperament to the combination of the different organs. The frame is well developed and the muscular system strong. The muscles are also firm and hard, especially in the male; though this will depend, to some extent, on the manner of life of the person, and whether his labour is altogether muscular or not. The nervous system will be healthy, evenly developed and steady, especially the voluntary nervous system which regulates nutrition, circulation, and respiration.

The lungs will be well developed and strong. In all cases of persons who have lived to be very

old, with almost uninterrupted good health, the lungs and the heart have been made of good stuff, and performed their functions properly. There is an evenness of development in a strong constitution, a harmony and equilibrium of the organs, and no enormous development of one set and a dwarfing of others. In the strong constitution there is no excess of fatty matter; but rather the reverse. Nor need a person with a good constitution be very large. A medium physical development is most likely to be enduring. Evenness of development and working without friction are of the utmost importance.

The blessings of a strong constitution are many. The person so happy as to be its possessor is far less liable to disease, and, if ill, is more likely to pull through and get well.

The person with a strong constitution does not tire so easily, is capable of great endurance, has excellent recuperative power, sleeps well, and is fresh and rested in the morning, has natural and healthful instincts, and under ordinary favourable circumstances will live to old age.

If the constitution be very strong, then all these things I have mentioned will be still more favourable.

From the strong constitution we now turn to the feeble one. Exactly the opposite condition prevails. Nutrition is imperfect, the heart is feeble, the muscles are soft and flabby, and have little power. The person tires easily with little exertion. Respiration is easily accelerated, and there is feebleness. There is not much energy to expend in external work. It is about all the body can do to keep itself going and in a tolerable condition of repair, and when great strains come upon it there is not energy enough to meet the demand, consequently the person breaks down, becomes physically bankrupt, cannot honour his obligations to society, the family or the community in which he lives. If disease comes, recovery is slow and imperfect, if the patient lives at all. The physician dreads such patients. The greatest care is always necessary; the greatest economy of the vital forces. The slightest physical extravagance cannot be tolerated.

Between these two extremes there are many degrees of strength which it is needless to mention. After the general truth is learned, it will be easy to classify constitutions as strong, very strong, feeble, very feeble and medium, or tolerably strong, as the case may be.

There are some instances where the person seems to be feeble, but where there is a toughness, so to say, of fibre ; and if there is not too great a strain on these persons they often live to be very old, and frequently outlive those who are apparently much stronger than themselves. They seem to have the faculty of economising their physiological resources, and adding to them rather than wasting them. This is an advantage which counts in their favour. The very strong are often so extravagant in the use of their life forces that they bankrupt themselves. Especially is this the case when the temperament is unfavourable. The practice of society is to put the great loads on them, to make them do more than their share of life's work. We all know how it is. As the millionaire in money is overrun by a horde of hungry applicants for help, so the physiological millionaire is subject to similar demands. With all this in mind it becomes very important that the constitution be strengthened and hardened so far as can be done. How is this to be accomplished.

In the first place, it cannot be done by the injudicious and indiscriminate application of rigorous methods, any better than by pampering

and protection from every breath of air or every change of thermometer.

Perhaps I cannot do better than to quote from an old letter which I published in 1868. It gives the method which Dr. Hosmer applied to his daughter Harriet, the sculptor. He had lost all his other children from consumption, and resolved to use another method with this one. "He took her into the fields, by the riverside, the seaside, and let her run wild among the hills; he horrified all the conservative, old and middle-aged ladies in his neighbourhood by innuring her to sun and storm, and teaching her to ride, drive, hunt, fish, row, skate, swim and shoot. In all out-of-door exercises she became proficient, and by this wise treatment grew up strong and vigorous. She became remarkable for her power of endurance, her steadiness of nerve and courage. She became one of the bravest of women, utterly fearless in danger."

Another method for hardening the constitution is going barefoot whenever season and opportunity favour it. It is well known to all, even the uneducated, that we take cold through the feet quite as frequently as in any other way. These members are more exposed to the cold

and the wet than the head; they are well supplied with nerves which connect with the brain and spinal cord, and through them the circulation is more or less affected for good or evil. On account of this, it is of the greatest importance that they be toughened so that slight exposure will not, either directly or indirectly, cause a cold or an unbalanced circulation and congestion of any internal organ.

Going barefooted in early life, and occasionally all through life, is one of the best methods of doing this. It brings the feet in direct contact with the earth, the grass, the rocks. It develops and strengthens the nerves in them; it hardens and toughens the skin; it allows the feet to grow and expand, the blood-vessels to enlarge and carry more blood, and this makes the feet not only more useful, but also more able to resist unfavourable influences of every kind.

In many places and at many times this practice has prevailed and still prevails; but as cities grow, and as those who live in the country adopt city ways of living, and what we call civilisation spreads, the tendency is quite the reverse; and now we have multitudes of people whose feet are rarely or never uncovered or touch mother earth. The result is, they become so tender, so

weak, so deformed, so diseased, that, from the standpoint of physical perfection, we ought to be ashamed of them. Indeed, we ought to be very much ashamed of all physical imperfection which we can with reasonable effort avoid.

It may be asked, "What can one do who lives in a city and has no means of following a natural mode of life, and no opportunity for himself or children to do what is here suggested?" If such is the case, there is nothing to hinder bathing the feet in cold water every night and morning and rubbing them till they are warm and dry. Now and then opportunities will occur, as when at the seaside or in the country, for giving them freedom for a few hours. One does not need to go barefooted all the time, but only at certain seasons. In addition, the feet should not be encased in hard, ill-fitting shoes, or those not well ventilated and clean. A little thoughtfulness in regard to the feet will be amply repaid by the better service they will render, as well as by their own greater comfort, and most of all by protection against colds, an enemy of the race in many ways, which will be secured.

Other parts of the body need hardening as well as the feet. The cold bath, exposure,

under proper conditions, to the air, living out of doors, the sun bath, and other methods of which more will be said elsewhere. Here I wish to mention only one other point, that of living within the bodily income.

There are schools for teaching economics in every college, but as yet none of them embrace the economics of the body. Indeed, this subject is still an obscure one, and we all have much to learn about it. This much, however, we know, that every human being has stored up in his frame a certain amount of accumulated physiological capital, and in addition to it, his daily income from the food he eats and the air he breathes. With this physiological capital he can perform a certain amount of work. If he expends more in labour than his daily receipts, he draws on the stored-up capital, and the tendency is towards exhaustion and bankruptcy. If he spends a little less than his daily income it accumulates, and his constitution strengthens. Generally in early life, and up to maturity there is an increase of this capital. In mature life there is an equilibrium of receipts and expenditures, and later in life the expenditures are above the receipts, and then old age comes on. It will not do to stop expenditures entirely, for

this would reduce receipts ; but the consumptive should try to make the receipts more than the expenses, so far as he can. With this surplus capital he can safely tide over many dangers and escape many evils. If the patient knows how to invest his surplus physiological capital to the best advantage, so as to make it bear a high interest, he may often out of a feeble constitution build up a comparatively strong one. And, finally, the most important method for hardening and strengthening the constitution is the cultivation of the courage and the will, both essential to a strong and an enduring bodily existence.

CHAPTER XI.

CLOTHING.

IN a chilly, changeable climate suitable clothing becomes an important factor in the hygienic treatment of consumption. The strong and the healthy need clothing in order to protect them from the cold and the heat, to ward off blows and contact with rough surfaces, or as a means of concealment and for the psychical effects which it produces. By psychical effects I refer to the pleasure which one feels when he is well and properly dressed, and the gratification of the taste that follows. There are other uses for clothing, as, for instance, to distinguish the sexes, for ornament and display ; but as these have no hygienic significance I shall not refer to them.

The questions to be considered from the standpoint of hygiene, are :

1. The material from which our clothing shall

be made, its weight, colour, and the manner of weaving.

2. Its construction.

3. Its adaptation to age, sex, climate, season and occupation.

First as to material. We have this from the animal kingdom, as wool, hair, fur, leather. From the vegetable we have cotton, linen, hemp, as the main varieties. For perfectly healthy people it does not make very much difference which is used ; but for a consumptive, or one disposed to this disease, it does make a difference. Everything that contributes to health and prevents useless expenditure of vital force, even in a small degree, must be considered. If we can take off a drain from the bodily resources of only one per cent. by any means we ought to do it. The slight advantage gained may make a great difference in the invalid's progress towards health. St. Paul recognised this principle when he said : " Let us lay aside every sin that doth so easily beset us in order that we may run with patience the race set before us."

It is recognised in business, in mechanics, in the sporting world, wherever success is to be achieved. All friction that can be avoided in machinery renders its work more effective and perfect.

What owner of a racer does not know he reduces his chances of winning a prize if he overloads his horse? With the consumptive the chances are against him. He, of all persons, must throw off every unnecessary and useless burden that he may increase his chances for regaining health.

With these thoughts in view, of what material should the clothing be made for the class of patients under consideration here?

My own opinion is, that, all things considered, soft wool is best, and these are my reasons :

Woollen allows of a more perfect interchange of the air next the body and the outside air than any other material we have, and this is important, for the air in our garments and under them is being constantly polluted by the exhalations of the body, and it is necessary that it be carried away freely. We usually think that our clothing is intended to, and actually does, keep the outside air away from us, and it does prevent a too rapid exchange ; but still a change goes on, and ought to go on steadily and constantly. None of us could endure for any length of time an air-tight garment. All clothing should permit the warm air next the body, loaded with vapour and animal matter, to be thrown off

and fresh air to take its place. Woollen garments do this more perfectly than either cotton, linen, silk, buckskin or chamois.

Pettenkeffer says : " If our clothing kept us warm in proportion to its power of excluding the air from our bodies, kid would keep us one hundred times as warm as flannel, because it allows one hundred times less air to pass through it in a given time ; and yet every one knows it is not so, but the very reverse." Of course the external air as it passes in becomes heated by our clothing, which is warm, so we never feel it except in a wind, when the interchange may be too rapid for comfort or health. Another reason for preferring wool is that its fibres are very elastic, and they do not mat down as cotton or linen fibres do, and thus diminish the power of the garments to hold a large quantity of air in the meshes and spaces between it and the skin. Wool, even if wet, is almost as elastic as when dry, and holds almost as much air. Linen and cotton mat down and exclude the air. This explains why, if we become wet in woollen garments, we do not feel so chilly as we do when wet in cotton or linen ones. Any one may observe this for himself by bathing in the ocean or other waters in a woollen bathing suit and after-

wards in a cotton one. The difference in their power to retain heat is best observed after coming out of the water and standing for awhile exposed to the air.

Again, the hygroscopic property of our clothing is an important factor in maintaining health. By hygroscopic property I mean the avidity with which it takes up and holds water. The body is constantly giving it off by insensible perspiration. Woollen takes it up more slowly and holds it longer than either cotton, wool or silk. Linen takes it up rapidly and passes it off rapidly. This is one reason why linen garments are so cool and comfortable in very hot weather. Woollen holds much more of it than cotton or linen, and, as I said before, without losing its elasticity and its power to hold a large quantity of air. For this reason it is better for the clothing of the consumptive than any other material would be.

The fibres of fine wool are also softer, and produce a more agreeable feeling on the skin of invalids, except in a few cases, than other material, and this effect must not be overlooked.

It is very true that some persons with strong will power can go thinly clad, even in the winter season, in cotton or linen garments, and do very

well ; but it will not, in climates that are changeable or cold, be wise for the invalid to run this risk unless he possesses an amount of will power that is unusual.

It may be wise for those with consumption, or a tendency to it, to discard all but soft wool, even for the collars, the pockets in the clothes, the linings of the sleeves, and the common outside white shirts. Some will call this going to extremes, no doubt, but it will generally pay in the end.

It makes some difference how the woollen is woven. For all underwear knitted goods are preferable. Those that are too tightly woven hold too little air and prevent a sufficiently free change of air for comfort or health.

It is very true that hygienists have devised goods from cotton which are very much better than those formerly made, and which come near to wool in the properties most desirable, but as yet they are not easily obtained, and until they are woollen clothing must be recommended.

The question as to how warmly the consumptive should dress is an important one. Shall he dress so warmly that the heat-producing powers of the body shall be taxed as little as possible ? By no means. He should be reasonable in this

respect, and cultivate the heat-producing powers he possesses to as high a degree of development as is consistent with his condition. He should not, however, tax them beyond this limit. At least the feet, legs, arms, and hands should not under any circumstances be allowed to long remain cold.

The cutting and fitting of the clothing should be such as to give perfect comfort and freedom of motion to the body, and should not in any way interfere with the normal circulation of the blood either in the neck or parts containing the organs of respiration.

The corset, so generally worn by women, should be at once and forever discarded, the skirts be made short and so divided that walking is not greatly interfered with. The waist should not prevent in the slightest degree abdominal respiration, which is as natural to women as to men, and which cannot take place when a corset is worn, even loosely.

As clothing produces a psychical effect as well as a physical one, the wearer needs to feel that he is well and neatly dressed and does not "look like a fright." This can all be managed by studying the subject from the standpoint of art, as well as hygiene. When this is done, we shall be able to dress healthfully as well as artistically.

The adaptation of the dress to the seasons of the year and the constant changes of temperature of the day must be wisely done, but it must be left to each individual, or, in the case of children, to those who have charge of them. It is important, however, that they make a study of the science of the subject, for there is a science of it, as well as of all subjects that relate to bodily welfare.

There are some evils connected with our dress, as that of weakening the skin by constantly keeping it in the shade, and at a summer temperature. These evils must be corrected by the use of friction, the cold bath, where it can be borne, by the use of sun baths at suitable times and under proper conditions, which will be mentioned in a succeeding chapter.

The colour of clothing has, except in very hot or cold weather, so little significance that I shall omit any reference to it.

The weight of clothing should be as light as possible, consistent with the object for which it is worn. Every pound beyond what is necessary only takes strength to carry it—strength that can be more profitably employed for other purposes.

Indirectly the bed comes under the head of clothing, though not usually so considered. In

it we pass one-third of our time, and the invalid more than this. The same rules apply to it as to other articles of dress, so far as the admittance and interchange of air and its hygroscopic properties and material are concerned. Further I need not consider the subject here.

CHAPTER XII.

THE HOUSE AND HOME.

MOST of us were born, spend a large portion of our lives, and will take our departure from this world in houses. In them we create an artificial semi-tropical climate, where we may dwell in comfort during such portion of the day and night as we are not engaged in out-of-door or active labours. It is safe to say that a majority of all houses are not perfectly sanitary; that they need doctoring as much as their occupants do, and that they not only cause many diseases, but retard their cure or prevent it altogether. There are few, indeed, of the readers of these pages who do not know of homes in which one after another of its occupants have died with consumption, or other disease of the lungs. There seems to be something in their very walls that causes disease, and those who live in them are in danger of losing health and life. Other

houses, by slow degrees, undermine the health of their occupants, but it is so insidiously done that they do not know the cause.

I will give some of the characteristics of a sanitary house and its surroundings:—

1. The site should be dry and the soil clean. If the site is not dry it should be made so by drainage, and if the soil is not clean it should be removed or purified. Few are aware that there is a constant interchange between the air of the soil and that of the cellar and house. This ground air may be very impure, and bring into the dwelling the germs of many diseases which weaken the constitution and lead to consumption. In malarious localities the soil is usually filled with the germs of malarial fever, and they may rise into the house when there is a current of hot air upward to cause a draft. If a consumptive lives in such a house he will rarely recover.

2. The cellar should be dry. I remember a house which, for convenience, was built so that a spring was in it under the kitchen. This spring furnished the water for the dwelling by means of a pump. The cellar was always wet. Two of the inmates of the house died of consumption, and others were threatened with it

before they were removed. There are many underground streams in large cities, and the houses built over or near them have wet cellars, and the death rate is larger in these places than elsewhere. So it is in almost every city and country town, and even in the farming regions. If you wish to take away from your household one serious cause of consumption and diseases of the throat and lungs, avoid houses built on a damp soil. Something can be done to keep back the water and ground air from the cellar by a good asphalt pavement, by a ventilator into the chimney, and by good ventilation of the cellar itself, but these methods are rarely taken advantage of.

3. There are many houses, the timbers of which are more or less decayed, and give off a musty atmosphere which pervades the whole building. These, too, must be avoided.

4. The walls of some old houses are filthy with the accumulations of poisonous substances from diseased breaths and the air from closets, kitchens and laundries, and no one can be perfectly healthy who lives in them continually. Don't try to get well of consumption in such a house. Far better build a hut on some suitable ground, or even in a tree, and live

in it than dwell in a house whose very walls are a source of danger.

5. The air in a house should be kept as nearly pure as out-of-door as can be. Invalids with any disease pollute it more than the healthy. The air which the sick exhale is loaded with poisonous products which should be carried out-of-doors as soon as possible.

To accomplish this there must be a great deal of fresh air admitted constantly; the more the better, provided drafts are not produced, or too low a temperature caused. Probably five thousand cubic feet per hour for the patient will suffice, provided occasional additional ventilation be allowed by opening the doors and windows, and letting the wind blow through them for a short time. Allowances must also be made for those not ill, for lights and fires; because these consume the oxygen of the air, and at the same time leave behind the products of combustion. A large lamp burning in a room will produce as much carbonic as several men.

Complete knowledge of ventilation and the amount of fresh air required hourly for each person cannot be given here. The whole subject is fully treated in standard works on hygiene.

The bedroom used by the consumptive ought

to be large and the windows open during such part of the day when it is not in use, even if the weather is cold, and partly open at night. It should be on the sunny side of the house, so that in winter it will receive the rays of the sun as nearly direct as may be. The sun's heat modifies the temperature of the house considerably.

The ventilation of the bedroom at night is sometimes a difficult problem. There should be a place for the escape of foul, as well as for the introduction of fresh air. If the latter can be brought in from several sources in small quantities, by each opening, rather than in a large amount in one place, it will prevent a draught, which is important. In the winter we have a much better chance to ventilate than during the summer, as the difference in temperature inside and outside the house is productive of exchange of air through the innumerable fissures in windows and door fittings to be found in every home. The occupation of bedrooms with closed doors and windows creates an atmosphere often sufficiently vitiated to cause weariness and drowsiness in the early morning, instead of that feeling of renewed life and vigour which should be experienced, and much of the headache and neuralgia so constantly met with may be reasonably

credited to this one source. If any one will take the trouble to return to his shut-up bedroom after spending ten minutes in the fresh morning air outside, he will be surprised to find how close and disagreeable is the atmosphere in which he has spent the last eight or nine hours. All hygienists have advocated sleeping in pure air, and the effects of camping out in a suitable climate, in pine woods, as a cure for the early stages of consumption, are well known.

6. Light, next to air, should be abundant. Bay windows, large windows with clear glass to admit the sunshine, should be provided. Light is a powerful stimulus to the nervous system. I have kept a careful watch in many cases of persons with nervous temperaments, and found that in nearly all of them they felt better, and could accomplish more work on a sunny day than on a cloudy one. The difference in feeling cannot be estimated in foot-pounds, but can be observed in the countenances, the lightness of the heart, and in all freedom from irritability.

If trees surround a house they obstruct the light and heat of the sun and cause dampness and darkness, and these conditions favour the development of consumption, and most certainly prevents its cure. In an institution in France,

where orphan girls were confined, scrofula was a constant evil. The shade trees made the house damp and dark, and were suspected of being the cause of the condition of the inmates, and at last were cut down, when the children got well without the aid of even the physicians.

In a town of 20,000 inhabitants in New England, excessively shaded by great elms, the streets most shaded have a high record of deaths by this disease. Bodily deterioration always results from such causes, and always will.

Heavily draped windows shut out the light of the sun almost as effectually as a wall, and make the room cheerless and dismal. Hygienists have emphasised this fact over and over again, until it has become stale, and yet the evil goes on. I spent an hour recently in the sitting-room of a man known as a millionaire, and so shaded was his parlour with drapery that, though it was in the daytime, he had to light the gas to show me some rare engravings. I felt a relief when I went out into the open air and sunlight.

It is not necessary that the sun should shine into a room all the time to make it healthful. The diffused light, though less powerful, has a great sanitary value. Our houses cannot be said to be sanitary unless this light has free access into them.

A house that is not sanitary can often be made so with little expense. There are few perfectly healthful houses anywhere, and this adds often to the expense of living, by loss of time with illness and the cost of curing it. A sanitary house and its healthful surroundings will frequently do more to prevent disease than the physician can do to cure it.

The surroundings of a house should not be forgotten. The streets, the shade trees, the drains, the barn and manure heaps, the swamps, the well and spring, or cistern, may all contribute to cause and prevent the cure of consumption. Indeed, often one of the reasons for sending a patient to another climate is to take him away from some of the unsanitary conditions in and around his own home.

Every dwelling, whether there be invalids in it or not, should be inspected now and then by some competent person.

These are some of the things to be observed in buying or renting a house :

1. If in a city, inspect the street, its direction, and the amount of sunlight the house receives ; whether the buildings about it are high and obstruct, or low, and admit air and light ; observe if it is clean, if the gutters allow impure water to

run off or not ; if the pavement is good ; notice if the sewer opens near the house, and if any trees darken the windows and cause dampness.

2. Notice the site, whether the soil is dry or damp, sand, loam, or clay.

3. Observe the yard, whether high walls surround it, whether paved or drained, whether slops are thrown around loose, the situation of the well, closets, and cistern, and if offensive odours prevail, or if goats, cats, dogs, or chickens are kept in it.

4. Note the material the house is made of, and how it is put together. If of wood, see if any is rotten. If of brick, see if walls are dry or damp. Observe the condition of the outbuildings. If in the country, notice the location of the streams. Note the size of the house and of the rooms, and especially of the bedrooms, and whether they are well lighted and ventilated.

5. Visit the cellar and notice its size, whether it is dry or damp, if ventilated and how, and the kind of floor and walls it has.

6. Examine the closets and see whether they are clean or not.

7. Examine the plumbing so far as it can be done, and if the pipes leak or not, if old or new, if of iron or lead, and if trapped properly.

8. Examine the ventilation and lighting of the main rooms of the house with great care, and observe all defects. Observe the number of inmates, and find out whether contagious diseases have prevailed, and if there is a cheerful outlook and inlook, and if the children are pale and sickly-looking. Inquire if any room is haunted; observe the paper on the walls, the size of the bedrooms and windows, the condition of the floors, the presence or absence of rats and mice; whether the house is heated by stoves, grates, steam, or furnaces; whether the roof leaks, and if the air of the house is offensive or not. See how the pantry is kept, and also the storeroom, and if any vegetables are allowed to decay in it. If flowers are cultivated, see if they are thrifty, for they, like ourselves, pine in bad air.

These hints will suggest others. They are of the utmost importance in the hygienic treatment of consumption and, it may be added, of other diseases, and also for the preservation of the general health.

CHAPTER XIII.

CLIMATE

CLIMATE is an important factor both in the prevention and cure of consumption. A glance at the statistical atlas of the United States, published as a part of the report of the census every ten years, shows several regions where there is little or none of this disease. One of these regions is on the Cumberland Mountains, in Tennessee; another is a portion of the Adirondacks, in New York; parts of Florida, Colorado, California, Arizona, Utah, are free. Most of these places are sparsely settled, and the inhabitants live principally in the open air, or by hunting and fishing, and such agricultural pursuits as are conducted in the simplest manner. These conditions no doubt act favourably in preventing the disease. The climate also acts at the same time beneficially.

As it may help to a clear presentation of the

subject, it will be well to define the word climate. We understand by it that condition of the atmosphere which relates to its temperature, moisture, pressure, and that electrical state of which so little is known. To these may perhaps be added such movements of the air as winds, storms, cyclones, &c.

Some of the most important factors that influence climate are nearness or distance from the equator, or large bodies of water; the presence or absence of mountains, deserts, and swamps; the height of the place about the level of the sea; the character of the soil; number of clear or cloudy days, and the character and extent of vegetation. Climates are also modified by man in clearing the land, in draining wet soils, and in cultivating crops; also by building cities and factories, from which escape smoke and dust to cloud and obstruct the rays of the sun. The climate in London is being gradually changed by the increased consumption of coal, the smoke from which adds every year to the number of its fogs. Man improves the climate by some of his acts and injures it by others.

For practical purposes, climates may be classified as cold, hot, temperate, mild, wet, dry, cold moist and warm moist, equable and changeable.

We sometimes speak of a sunny climate, a bracing, exhilarating climate, a relaxing climate, a windy climate, and these expressions carry with them a certain force, and help to a better understanding of the subject.

It may be safely said that only a comparatively small portion of the earth's surface has an ideal climate for the best development of the race. Much of it is unfavourable either by excess of heat, cold, or moisture, and other conditions not favourable to man in his best state. Still, by clothing, houses, and other means, we create around us an artificial climate in which life is made, not only tolerable, but actually delightful to healthy persons during a long life. And, as our sanitary knowledge and our culture increases, we shall, no doubt, be able to improve this artificial climate so as to avoid many of its present evils, especially the foul air arising from imperfect ventilation, the lack of light, also by better arrangements for admitting more sunshine, and, like the old Romans, perhaps have rooms where sun baths may be employed as a means of health.

The climate of an elevated region is noted, among other things, for the absence of consumption. Dr. Herman Weber, in a work much quoted on the Swiss Alps, says: "Tubercular

phthisis occurs not rarely in the lower mountainous or sub-Alpine region, but in the true Alpine region, it seems to be almost absent. Thus, it is of very rare occurrence among the priests on the great St. Bernard. And Dr. Brüger has scarcely ever observed it amongst those inhabitants of the Upper Engadin who have not resided in other countries; and he has further found that this disease is generally cured in the natives of Engadin when they return to their mountains, after having contracted it elsewhere, before it has made great progress. Dr. Albert, of Briançon, in the Dauphiné (4,283 feet above the level of the sea), bears, according to Lombard, the same testimony. These observations are quite in harmony with what we know of the occurrence of tubercular phthisis in other mountainous countries. Thus, patients afflicted with phthisis at Lima, S. A., are sent on the adjacent mountains of Peru, where the disease is scarcely known, at an elevation of about 8,000 feet. It is described as very rare at Mexico (7,000 feet) and Quinto (8,700 feet), and still more so in higher elevations. The elevation beyond which phthisis becomes rare, or is absent, seems to vary considerably in different latitudes, and to become lower as we

proceed toward the poles. In the tropical zone it may be regarded as becoming rare at 7,000 feet; in the warm temperate zone, above 3,500 to 5,000 feet; in the colder temperate zone, 1,300 to 3,000 feet elevation. In Switzerland, between 46° and 48° N. lat., the frequency of its occurrence diminishes above 3,000 feet; in the Black Forest, between 47° and 48° N. lat., above 2,500; in the Thuringen and Silicia, and in the Hartz, between 50° and 52° N. lat., above 1,200 to 1,400 feet. Füchs states that at Brotterode (1,800 feet), in the mountains of Thuringen, the percentage of deaths from phthisis is only 0·9. Brehmer assures us that in the neighbourhood of Görbersdorf, in Silicia (1,700 feet high), tubercular phthisis has never been seen by him among the inhabitants, an observation which Dr. H. Biegel, who has for several years resided at Reinerz (1,700 feet above the sea and near to Görbersdorf), has confirmed.

Dr. Parks, in his elaborate work on Hygiene, adds to this that "Although on the Alps, phthisis is thus arrested in strangers, in many places the Swiss women on the lower heights suffer greatly from it; the curse is a social one; the women employed in making embroidery congregate all day in small, low, ill-ventilated rooms,

where they are often obliged to be in a constrained position ; their food is of a poor quality. The men, who live in the open air, are exempt."

The same results have been observed in our own country. The United States offer as varied and as fine varieties of climate as can be desired for the consumptive. Almost every State has some portions which may be called particularly healthful. For high altitudes Colorado offers advantages of a superior class. There is great immunity from consumption on the high mountains of this State, except in cases where the disease has been acquired elsewhere. Thousands of persons have recovered from the early stages of this disease in the high Rocky Mountain regions, some patients going to an altitude of 11,000 feet above the sea. California, Florida, the Carolinas, some portions of Tennessee, New York, and a portion of New Jersey, Minnesota, Arizona, Utah, and other States offer advantages for those who have a tendency to consumption. Sometimes a residence of a few years in the best of these climates lifts the patient above the line of danger from this disease, so that with care he may go through life and escape it altogether.

It may be asked why a high altitude is favourable for such persons. The following are the main reasons :—

1. At a high altitude the weight of the air is much less and, consequently, respiration must be deeper to secure sufficient oxygen for the needs of the system. This is an advantage, as has already been shown.

2. The micro-organisms which cause consumption do not thrive in high altitudes, and there is also far less dust in the air a few thousand feet above the level of the sea to irritate the lungs. Take the neighbourhood of Pasadena, California, as an example. On a high plateau, back of the town, which lies in the valley, the air is free from dust when the air of the city below is, during wind storms in dry weather, full of it.

3. There is less moisture, also, and a dry air is favourable to the consumptive. In a dry air the carbonic acid given off and all the products of respiration are more abundant, and this relieves the system of the poisonous products produced in the body. The skin also throws off more easily excretory matter. Excessive moisture in the air acts to some extent on the system as would a board over a chimney which carries off the smoke. It shuts in more or less of the products of those changes in the body, caused by combustion, which ought to be allowed to escape freely.

4. There is also less cloudiness and more light and sunshine, and this is a favourable condition, as will be seen later.

5. Mountain air at a height of 5,000 to 8,000 feet is cooler and more bracing during the entire year.

6. There is less strain on the body. There is generally an absence of large cities and other deteriorating and injurious influences. The scenery has a good psychological effect on the nervous system. There are opportunities for climbing and hunting, and botanical, geological and other studies which keep those who are strong enough in the open air, and interested, and these all may have a favourable influence.

A friend informs me that when building bridges in South America he met a consumptive man who found the climate of California unfavourable, but lived in comparatively good health at an elevation of 11,000 feet on the mountains of Peru.

It must not be inferred, however, that I would send all persons with a tendency to this disease to the mountains. Almost any region that is generally healthful, and where the death-rate from this disease is low, may be all that is required. So much injury has resulted from

sending those far advanced with disease from home, that if the climate there is fairly good and free from malaria, it may be better to remain in it rather than make a change which may bring conditions little expected.

The following characteristics of a good climate may guide us :

1. A dry rather than a moist or wet one should be chosen.

2. A cool rather than a hot one, though there are some hot dry climates where the disease is rare.

3. A climate sufficiently elevated to avoid malaria, or where this disease is absent. A malarious climate favours consumption.

4. As a dry climate is more likely to go with a sandy rather than a clayey soil, this should be borne in mind. A sandy soil becomes dry quickly by the percolation of the water through it ; a clayey soil holds the water till much of it evaporates into the air, and this evaporation cools the soil, and the people suffer from colds, through cold, wet feet, which would not be to such an extent on a sandy soil. I remember very well a man with a large family who years ago lived in Lakewood, N. J. ; he always insisted that his family were free from colds on the sandy

soil of that place, because their feet were rarely wet on account of the rain going so soon into the earth, which would not be the case where a clayey soil prevailed.

5. It has been a belief of physicians that a mild climate is favourable for the consumptive, and one where there are few winds ; but this is not necessary ; changes are not so great evils as stagnation of the air.

6. Sunshine is a great purifier of the air and destroyer of germs, and so a climate with abundance of sunshine may be considered more favourable than one in which cloudiness prevails.

It sometimes happens that persons of a consumptive tendency desire to locate in a region free from this disease, where they can engage in fruit growing or other out-of-door industry. There are many places which may be commended to such persons. Among others, the region around Florence, Arizona, has some favourable features. The climate is a warm one, but the air is dry. Among the attractions are its beautiful shade trees of pepper and Chinese umbrella, that line either side of the principal streets from one end to the other and offer protection from the sun. The streets are also irrigated by miniature streams of water that keep the gutters

cleansed and supply the gardens and orchards. The town is situated on a plateau or mesa, about half a mile from the Gila Mines. It has an elevation of 1,450 feet above sea level, and has the reputation of being one of the most healthful places on the Pacific slope. People who go there in search of relief from lung and throat diseases derive great benefit, and unless gone too far they are almost invariably cured by a year's residence. The Mexican population that formerly preponderated is rapidly disappearing, and its place is filled with Americans of energy and progressive ideas. The people are especially proud of their schools, and there is more than an average refinement and cultivation among the people.

As a fruit region it is destined to take a front rank, as nearly every description of fruit grows in profusion, including grapes, figs, lemons, limes, oranges, olives. The peaches, pears, apricots, and quinces are not equalled by any in the United States, and bear the second year if well watered, as do also soft shell almonds. The olive oil is of very fine flavour, and makes an excellent food for those with a tendency to phthisis.

Another locality is the Sevier Valley, in Utah. There is no better apple and peach country in

the world than in this valley, and the smaller grains and fruits grow in lavish abundance. It seems that the climate of the valley is mild all the year round, with good tonic properties, exciting activity and deep breathing. On the tops of the high mountains there is always snow enough to gladden the eye, even of a Laplander, and during the winter season it encroaches on the plateaus and sometimes the valleys. The climate may be recommended as the Eden for consumptives, it being exceedingly salubrious and healthful.

The favoured place is about 150 miles directly south of Salt Lake City, in the high lake region. Fish Lake is 8,763 feet above sea level, and Grass Valley and Rabbit Valley between 7,000 and 8,000 feet. All grades of climate may be experienced within two hours ride or climb. Small grain, especially barley and oats, flourish there in great abundance. It is a land of milk, butter, and honey. Mr. C. C. Kelly, who has been in all the Territories, insists that the "Utah Eden" is the finest climate on this continent.

The climate here favours stock raising, especially horses, cattle, and sheep. Abundant game is found and trout streams abound.

CHAPTER XIV.

BATHS AND BATHING.

THIS is an important branch of our subject. Hydrotherapy has within the last fifty years become well established, thanks largely to Priesnitz and his followers. In consumption it has its value, but must be managed with the greatest care. In preventing this disease its importance can hardly be overrated. The cold bath in the morning is a tonic and very invigorating for a majority of persons, and if of short duration and followed by abundant friction and a good reaction, it fortifies the skin, so that colds are not so likely to occur. No doubt it strengthens the whole thorax by bringing more blood to it and nourishing the tissues of this part better, also making them more flexible, thus securing better respiration.

In the first stages of this disease its use may have a very beneficial effect, acting, of course, in

the same way. I know many persons have been cured who were only in the beginning of this disease. When, however, the malady has gone on to the second and third stages, the cold bath is likely to do more harm than good. The reasons for this are simple. The patient in these stages has become greatly weakened. He is not able to take the bath himself, or to give that thorough friction and massage to the skin which is necessary, nor to react against it. The result will be chilliness, contraction of the capillaries of the skin, driving the blood inward, causing greater congestion of the internal organs, and, as a result, an aggravation of the malady.

This is very unfortunate, for the skin of the consumptive is usually much debilitated and requires proper care. Indeed, if this organ could be kept perfectly vigorous, a cure would be far more likely to be realised. In such conditions some good may be secured by taking advantage of institutions where baths, especially warm, vapour, or Turkish baths, may be taken when necessary, under the eye of a skilled physician or attendant, with the greatest care and proper attention given after it to a gentle rubbing by a healthy attendant, who is willing to be careful and do his work wisely. If this cannot be done the bath had better not be taken.

The oil bath may be more generally serviceable in advanced stages of consumption, and is available anywhere. It does not abstract animal heat from the body, need not weaken the system, and may prove of real service to the skin in more than one way. It should be applied as hot as it can be borne, not in too large quantities, and thoroughly rubbed in with the hand. A considerable amount of hot oil will be absorbed by the skin on the bottoms of the feet, the palms of the hands, the insides of the thighs and below the armpits. Smaller amounts will be taken up elsewhere. This oil bath, I believe, nourishes the skin and gives it greater toughness and more warmth. The best oils are olive oil, refined cocoanut oil, or almond oil.

Oil baths may be taken daily or less frequently, according to circumstances. It may be taken alone, after the water or other bath, or in connection with the sun bath. In the latter case it had better be taken before the bath, rather than after it, as it will prevent any blistering or burning of the skin, and the rays of the sun will stimulate the absorption of the oil, which is important. After the oil bath, it is well to wipe off with a soft towel any excess of oil, to prevent soiling the clothing.

A word about the rubbing after a bath, whether of oil, water, or the Turkish bath. A weakened patient may be easily tired out with rubbing by a vigorous person, and this must be understood. The rubbing should be adapted to the patient's strength, and always gently and slowly performed. The patient, too, should relax himself all he can, and be as nearly inanimate as he is able. He may tire himself out by trying to resist the work of the rubber. No one but a sympathetic and trained person is fit to do this work. That it exhausts the rubber I have no doubt. I do not know why, but the general belief that the sick one drains the well one of life force no doubt has some foundation in fact.

CHAPTER XV.

THE SUN BATH.

THE sun bath was a great favourite with the Greeks and Romans. Every gentleman's palace was furnished with one on the roof of the house. The naked body was exposed to the direct rays of the sun, the head being protected to prevent congestion of the brain and other bad effects. The sun bath may be made to do great good or harm, according to whether it is used wisely or not. It is a powerful stimulant to the skin, and through it of the nervous system, but may weaken the body as well as strengthen it on account of its relaxing effect on the nervous system when used unwisely. For the consumptive, it may prove very useful when other baths cannot be borne well. It abstracts no heat from the body—an important point—but actually raises the temperature, sometimes one or two degrees, without causing fever. It toughens

and hardens the skin, which, as I have already said, is greatly debilitated in this disease, and anything that will do this has value. By it a gentle or a vigorous perspiration may be produced, according to the heat and the length of time devoted to it. I have had as thorough sweating in a sun bath when the temperature of the room was only 110° as in a Turkish bath at 150° . The sensations of the body are delightful, and here lies a danger, for when one enjoys it so much he is loth to quit after he has had as much as can be beneficial.

The best time to take the sun bath is in the forenoon, when the animal heat is low and the body most sensitive to cold. The length of time must be gauged by circumstances—by the degree of heat, by the strength of the patient, and other conditions.

In beginning, it is well to be careful, and perhaps thirty or forty minutes, and in some cases even less, is sufficient; after the system has become used to it, an hour or more, in any but the hottest part of the year, when the heat is apt to be excessive and overpowering.

In the beginning it is perhaps better not to remove all the clothing, but take the bath lightly dressed, allowing the sun's rays to strike only a

portion of the naked body, as the legs or the chest. Little by little a larger part may be exposed and, finally, the whole body up to the neck. The head should always be protected from the direct rays of the sun. The eyes, if not already weak, are not so much injured by the bright light as many may think; indeed, I am confident they are strengthened by it, unless they are at the same time strained by reading, or by looking too intently on anything from which the sun's rays are reflected.

The place for taking a sun bath is important. Where the naked body is exposed to the direct rays of the sun, of course seclusion is necessary, and this is best secured by a room of fair size at the top of the house, exposed both to the south and the east, so as to receive the morning and midday sun. Large windows or lights of clear glass running around the two exposed sides of the room, two feet or so from the floor, and at least four feet high, will admit sufficient sunshine. There should be no obstruction by walls. The glass may slant inward as it goes up, if convenient, and it should be secured against any injury from strong winds which otherwise might blow it in during a wind storm. Ventilation may be secured by a door

opening into another room so as to avoid a draft. A room like this does not require to be heated in ordinary weather, and the protection and privacy are sufficient.

A plain cot, over which has been spread a clean sheet, and a hair pillow are all the luxuries in the way of furniture required. The room need not be very large, but it should not be too small, or it will quickly become too warm.

At certain seasons of the year, in cities where the houses are high and the roofs flat, by means of screens, a place for a bath may be made on the roof; but generally this is inconvenient of access, and cannot be used when there is much wind or clouds in the air. Besides, exposure of the naked body may cause some distress as being immodest; this must always be considered.

A large bay window may also be used, but it is not so good as a room specially devised for the purpose. For taking the sunshine when lightly or partly dressed, a bay window or a porch protected from winds can be used to advantage.

In the country, secluded and sheltered places can sometimes be found where a sun bath, for males at least, may be had out of doors at those seasons of the year when the weather is favour-

able. These out-door baths might be called sun and air or light and air baths combined. Lovers and children of nature will appreciate them, and I have known them to be used very beneficially. The whole skin becomes as bronzed as the face and hands of those who spend a summer at the seaside. Women may take similar baths lightly dressed and receive much benefit from them. These air and light baths may be continued, with occasional changes of position and walking about, for several hours, even half a day. The place must be dry, and every care taken to guard against taking cold.

The blessed sun is and always will remain the highest quickener of life.

Arnold Rikli, of Veldes, Austria, is perhaps one of the most vigorous of the modern advocates of sun baths, and also of light and air baths. His motto is : Water is a powerful health-promoting agent, still more powerful is the air, but most powerful of all is light. For more than forty years he has used it systematically, and often with signal benefit for his patients. Dr. Willibald Gebhard has kindly given me some account of Dr. Rikli from his own personal acquaintance, and of his experience under this treatment.

Dr. Rikli's Institution is situated on a beautiful little lake, surrounded by hills and mountains. A picturesque little island lies in the lake, not far from the mainland, on which is a church from which on Sabbath days the melodious tones of its bell are sounded in the air. The Institution is supplied with excellent water from three large springs which pour their contents into three large pools. The climate is modified by its nearness to the Adriatic Sea.

One of the peculiarities of this Institution is the arrangement for light and air baths. Numerous small, open houses, eight or ten feet square, raised a few feet from the ground, partly shaded by trees, and arranged with screens so as to protect the patient from the wind or wet weather, have been erected not far from the lake, and here, during the warm months of the year, patients suited to the treatment may sleep at night, and bask in the light and air in early morn, in suitable weather, with little or no clothing. Each sex has a colony on a little mountain for its own use. Dr. Gebhard describes the life here as being almost idyllic, and the effect upon the health is often marvellous. These, however, are not the sun baths.

These latter are arranged in long galleries

called sun galleries. The whole body is exposed to the direct rays of the sun, generally in the forenoon, first one side and then the other, always excepting the head. At first, ten minutes or so may be all that the patient can bear, but after a while he takes them longer. A morning and an afternoon sun bath are sometimes taken ; but the afternoon bath is not general, being mainly for the limbs. After the sun bath a short water bath is taken to cool the body slightly, and if all is properly done the feeling of peace and joy are almost complete.

In the hottest days of summer, in the days called sultry, the sun bath may be overpowering, and then caution is necessary. In the autumn, winter, and spring it may be used freely.

I believe that in the future sun bathing will be a powerful hygienic agent in treating disease, and this will be hastened by its careful study and scientific use.

CHAPTER XVI.

FOOD AND DRINK.

THE question of food for the consumptive is one on which there is a great variety of opinions. That patients have had good results from many different courses of diet cannot be doubted. Some have been benefited by an almost exclusive diet of animal food, some from a mainly vegetable, and others from a mixed diet. These facts have confused many persons who are not able to explain the reasons for differences of practice leading to the same result. I will give a few suggestions which I think will aid the patient. In the first place I will mention some things which must be avoided.

Irregularity must be avoided. I do not mean that there shall not be the slightest variations at any time in a prescribed order and time for eating, but that in general great irregularity shall not be permitted. If, however, it is not possible

always to be perfectly regular, the patient must not fret and worry about it. Better to be irregular than to do this.

Eating indigestible food should not be allowed. Pies and cakes and rich puddings, as ordinarily made, had better be discarded altogether. Drop them out of the bill of fare, and do not think or even talk about them. 'To be for ever talking about one's food and thinking this or that article is injurious produces a worse effect than to eat everything indiscriminately. It calls too much attention to the processes of digestion and, strange as it may seem, this exalts the sensibility of the stomach and may be itself a cause of indigestion. Dr. George Moore, in a work on "The Power of the Soul over the Body," says : "A man may attend to his stomach till he feels the process of digestion ; to his heart till conscious of its contractions ; to his brain till he turns dizzy with the sense of action within it ; to any of his limbs till they tingle ; to himself till tremblingly alive all over ; and to his ideas till he confounds them with realities."

The same author says, "Many diseases are produced, increased, and perpetuated by the attention being directed to the disordered part ; but employment which diverts the attention from disease often cures it."

Many a case of indigestion has been cured by ignoring it, by ceasing to think about it; many a case perpetuated by constant attention to it. We may learn from this a valuable lesson.

Over-eating is unwise; but if a proper choice of digestible food is made there is little danger of this. Over-eating produces its worst effect on those who load the stomach with things unsuitable. The normal eater rarely over-eats. Indeed, it may be safely said that the consumptive should eat all he can digest. He has, at least, a tendency to physiological bankruptcy; food well digested and stored up is an antidote to this. It must, however, be remembered that only so much food as can be managed by the digestive organs can serve any useful purpose, and all additions to this do harm.

Rapid eating and insufficient mastication are to be avoided. These are evils widely spread, the result of bad habits formed in early life. They had better be mastered in the beginning. It will prevent much trouble.

Food for the consumptive should be rather rich in the proteids and fats, as he is, in most cases, greatly deficient in these substances in his system.

The articles of food most important for the consumptive are the following:—

Good bread. I would emphasise the word "good," because, notwithstanding the progress of our time in the art of cooking, a great deal of poor bread is made and eaten, and those who make and eat it do not seem to know that it is bad. Bread should be made of the very best flour ; that known to be rich in gluten is preferable. The mechanical state of bread is important. The best examples of a perfect mechanical state are seen in the French loaf or the Vienna bread. They are so porous that the saliva of the mouth penetrates every part, and this promotes the conversion of the unconverted starch into glucose, a form of sugar which is soluble and easily absorbed. There is a widespread opinion that for the consumptive starchy food is unsuitable, and for this reason bread is often proscribed. But there is no article of food so easily and quickly digested as starch in moderate quantities, provided it is properly cooked and masticated. If not well masticated and digested it passes out with the excrement and is lost. Bread that is doughy does not dissolve in the mouth and is not easily digested. It cannot be called the "staff of life."

Bread may be made from good white flour, or the whole meal flour, and if well made be whole-

some. In some respects the whole meal flour is preferable; but I shall not in this work enter into a discussion of this point. I do, however, insist that the bread shall be good, light and well made. It ought never to be eaten fresh.

Milk is another article which I believe may, in most cases, be used advantageously. I know there are dangers from the milk of cows sick with diseases of the lungs, and such must be avoided. Milk from perfectly healthy cows exposes one to no dangers. The fresher the milk can be had the better. If the consumptive can take it just after it is milked it will be better than when it has stood some hours. Sometimes this can be done, as when one lives in the country and can have a glass of it freshly drawn from the cow or goat. Milk may be bottled fresh and tightly sealed, and kept cool and fresh for some time. Milk may be enriched by the addition of a little cream, and for many cases this is preferable. Nearly every one likes the taste of cream. A glass of milk and cream taken a little while before going to bed, is sometimes very beneficial.

Bread and milk combined make a most healthful and nutritious meal, and may be used as freely as the patient desires.

Unfortunately, milk does not suit every one, but produces indigestion, dullness and headache. If this cannot be remedied, then it is better that this food be avoided. Substitutes for it ought to be abundant, and in the future no doubt will be. Sometimes cocoa or chocolate may be used in place of it. If it clogs or cloyes the system after using it a few days, then discontinue it for a time, or use less. The milk of the goat could be substituted for cows' milk, and may be had very fresh by keeping one or two of these animals at hand near the house. Goats milk is richer than cows', and as this animal is never consumptive no danger need be felt of contracting this disease. The goat is one of the most healthy of all domestic animals, and for invalids the use of its milk could be extended with great advantage.

Eggs are quite rich in material capable of easy conversion into protoplasm, or living matter, and also in fat. They are easy of digestion, and can be used in place of meat. A perfectly fresh raw egg taken in the morning before getting out of bed, or as a part of the breakfast, or in the middle of the forenoon, will serve a good purpose, provided, of course, the stomach is clean and not foul, as is sometimes the case.

If the stomach is not clean, a glass of hot water, as hot as can be taken, should be slowly sipped down at least half-an-hour before any food is taken. It is wrong to put good food into an unclean stomach to be mixed with the foul matter and its character injured by it. It is very easy to take a raw egg if one is willing to do it. Break the large end and remove all the shell that you can without losing any of the egg, and swallow it at one swallow. It has really no taste and requires no mastication.

Eggs may be boiled three or four minutes and put on bread; or cooked fifteen minutes at a temperature of about 190° , when the yolk will be hard, but the white of a curdy consistency, very delicate and easily digested. Or they may be poached by dropping into boiling water for a short time. They may also be made into custard and used as freely as is agreeable. Eggs should be very fresh in order to render their best service to an invalid.

Eggs, if used too frequently, may cloy, in which case they should be discontinued for a short time.

Eggs are sometimes beaten up into a froth and then used. This I regard as a disadvantage, as each bubble of froth holds air which is swallowed and may help to cause flatulence.

Oysters often serve a good purpose for the consumptive. They contain considerable protoplasm which is easily digested, and often produces a good effect on the nervous system. It is better, if possible, to take them perfectly fresh and raw, with a little lemon juice. Take small ones rather than large ones and the most delicate rather than rank ones. Avoid the latter.

Fish is a very nourishing food, especially in those substances that repair the waste of the tissues, that is, albuminous matter. Taking milk as a standard, fish contains from eight to nine or more times as much albumen; indeed, it contains more than beef.

As to the digestibility of fish, of course there is a difference in different kinds. Those containing the most fat or oil, and those with a strong taste are least digestible.

Fish is more easily digested than butchers' meat, providing it is properly cooked. Its fibres are shorter and more easily broken up and brought into contact with the gastric juice, in which they readily dissolve.

Dr. T. Lander Brunton says: "Next to soup usually comes fish, which is digested more easily than butchers' meat. I have already mentioned

more than once that the rapidity with which anything dissolves in the stomach depends very much on the fineness with which it is divided. Beef is acknowledged to be less digestible than mutton, and mutton less digestible than fish. If we compare the different kinds of flesh we will find that in beef the fibres are longer and harder than those of mutton, and those of mutton longer and harder than those of fish. The muscle fibres in fish are arranged in flaky masses, and are not only very short, but very readily separated from one another."

In recommending fish to the consumptive, however, I only advise the more delicate and finely flavoured ones, and not those which are coarse and rank to the taste. The difference between fish of different kinds, in this respect, is very great.

Fish, to yield their best results, should be freshly caught and not salted ones, or those which have been long out of water. Stale fish had better be left for those whose digestions are like the ostrich's, equal to any task.

The manner of cooking fish is important. It should be done so as to bring out their finest flavours and preserve their nourishing properties. Fish, for instance, when boiled, if put in cold

water, has much of its soluble albumen dissolved and lost before the water is hot enough to coagulate it, and this is a positive injury. The art of cooking it—for it is an art, and a fine one—should be thoroughly mastered by practice. Sometimes the patient, whether man or woman, is able to do this, in which case it serves as a means of occupation and recreation. Sometimes he is situated so that he can catch the fish himself; he will find this a double advantage, for it will take him out of doors and occupy his mind, which will be useful. This, however, would only be in the early stages of the disease, in suitable weather, or when there is good prospects of recovery, and when trout or other streams or places for fishing are near by.

Game, especially the quail, partridge, squirrel, and rabbit, and also fowl, are all nutritious and digestible, and when fresh and healthy may be used to give variety. None of them are relished as a part of the daily bill of fare; but for change, and to tempt the appetite if it flags, they are very useful. Mutton or lamb is preferable to beef, because both the fat and the lean of the former are more easily digested.

Beef is the standard flesh food of our race, probably from habit and the ease with which

it is bred and provided. Beef, as already stated, has a long, hard fibre. This is partly remedied by chopping it fine before cooking. There has of late arisen an alarm concerning the use of beef on account of the danger that the very disease we are considering may exist in the animal and be conveyed to the patient. This danger is greater when the article is only slightly cooked. No doubt this is a real danger, and on account of it, it may be worth considering whether we cannot obtain better food from other sources. Surely in the future, when the science of dietetics and human progress has become further advanced, we shall be able to do this; but till then we must do the best we can with our present knowledge.

Potatoes, if not too old or injured by light or bruised by much transportation, may be used, but should be cooked by baking. This renders the starch easily converted into nutriment. A little cream makes a good dressing.

Rice is also a carbonaceous food, and if properly cooked is very digestible. Both help to make variety, and need not be discarded on account of the amount of starch in them.

That the consumptive requires fatty food is now well established. To supply it, cod liver oil

has become a remedy in almost universal use. The arguments in its favour are its digestibility. The objections to its use are its offensive taste, and the fact, in spite of its supposed digestibility, it does often upset the stomach. That it has proved useful in many cases I will not deny; that it will be superseded by other oils I firmly believe. Olive oil is one of the substitutes which will take its place. It is easily digested, and may be formed into an emulsion which does not offend the stomach. Butter and cream in moderate amounts, mixed with or taken in chocolate or cocoa, all furnish fat in an agreeable form. Even milk itself contains fat emulsified better than any artificial emulsion, and in an agreeable form.

With the exception of the peanut and the chestnut, nuts are free from starch, are rich in oil, and albuminous matter, and these constituents of our food are important. Those who dislike flesh may sometimes find nuts will supply the albumen required, which would otherwise be deficient. It often, however, takes time for the system to accustom itself to their use, and so the patient should be careful and not take many at once, but "go slow," and by degrees learn to use them.

Soups for the consumptive are not only agreeable, but useful, as much nutriment may be conveyed in them. Almost every variety that is relished may be taken. Those who cannot take milk should make a study of soups, so as to be able to combine in them substances which will take the place of milk. In the future much may be expected in this direction. Perhaps we can even improve on milk for adults, at least, and be able to get along without it. It would be well for some of our masters of cookery to devote their energies to this subject.

Gruels are also good fluid foods, and may be made richer than milk and very palatable. Gruels are mixtures of milk, water and some farinaceous flour. The proportion of the milk and the water may vary indefinitely, or either of them may be omitted if desired. One of the best gruels is a mixture of finely ground oatmeal and barley flour, about half of each, though the proportion may vary. It may be objected that the starch in the farinaceous flour, not to any considerable extent, coming in contact with the saliva of the mouth will not be changed. To remedy this there are two ways: One is by cooking it longer, and the other is by adding a small amount of malt flour after the cooking,

and a few minutes before eating it. Malt flour, as is well known, is the product of the malting of the barley. All the coarse parts should be sifted out, if this has not already been done. It does to the starch what the saliva does, converts it into a soluble substance. This may be observed by the greater fluidity of the gruel. Half a teaspoonful of malt flour put on a saucer of oatmeal before eating renders it quite fluid. It is not, however, so palatable, and this is an objection; but if a very small quantity only of the malt flour is used, this need hardly be noticed. There are some who believe it is better for the patient to hold the gruel in the mouth long enough to mix the saliva with it, and certainly there can be no objection to this, but some advantage. Dr. Fothergill believes there is a great future for malt flour to be mixed with farinaceous foods in order to convert their starch.

In a little book on Food and Work I have spoken fully about the use of the juices of fruits as liquid foods. In small quantities, taken frequently, they are very refreshing and useful. Sugar may be added to make them palatable. Kept close at hand and taken for refreshment, one or two swallows at a time, they serve a better

purpose than when taken less frequently in larger quantities.

The question of a vegetable diet for the consumptive will probably have more interest in the future than at present. Vegetarians have not as yet become sufficiently numerous to demand attention from scientific students of dietetics, nor have such students been favourably inclined to its theories and practices, to deal fairly with it. That some persons, who have been threatened with consumption, and some who have even been in its first stages, have adopted this method of diet and recovered, or kept the disease in abeyance for years is significant. I have known several instances myself; but in addition to the diet, which has generally included milk and eggs, they have fought the disease at every point by other hygienic measures, which have been advocated in this work. On the other hand, I have known persons to adopt this method of diet and become consumptive, and die of it; but this is not an argument against the diet, but against an unwise employment of it, or a bad selection of food. Dr. Anna Kingsford, in a lecture in London, said: "I cured myself of tubercular consumption by living on vegetable

food. The doctors told me I had not six months to live. 'What was I to do?' 'Eat raw meat and drink port wine.' I went into the country, ate porridge and fruit, and got well." She, ten or twelve years later, after exposure to rain for several hours, contracted pneumonia, and again fell into consumption and died, as multitudes do who eat flesh. But during these years she lived a very active and useful life, and the world will not soon forget her services to mankind.

So important do I regard the dietetic treatment of consumption, that I would advise all inclined to it to master the subject of foods, as they do bookkeeping if they are accountants. Let them learn to cook the most perfectly prepared dishes, and become rational epicures, if there can be such a thing. The cook rarely dies of this disease; she is more likely to have gout or rheumatism, because she does not unite her art with science; the two must go together, as either alone will fail of producing the best results.

Little needs to be said about liquids, but that little is important. The natural and ideal drink for man is pure soft water; but we have formed the habit of combining it with various soluble

substances which are nutritious, or which act on the nervous system either as stimulants or as narcotics. There is no harm in combining foods and drinks into one article to a certain extent. Indeed, nature does this for us on a large scale in nearly every article used for diet. We need, however, more liquid in the system than nature furnishes us in articles eaten, and must provide for it so as to produce the most good and the least harm.

Pure water, we know, is a healthful drink. Even that containing a small amount of mineral matter, as we find it in the best wells and springs, we use without injury; but if there is very much mineral matter, so as to render the water hard, it is less wholesome. The rule should be to use soft water. It cannot be too soft. If it contains only one or two grains of mineral matter to the gallon it may be considered excellent. If the water contains much more mineral matter then we should either soften it or find a better supply. It may be perfectly freed from mineral matter by distillation, that is, by converting it into steam and condensing the steam in some vessel properly arranged for the purpose. This, however is rarely done on account of the trouble it causes.

Water containing much carbonate of lime may be softened by hard boiling for about fifteen minutes. The heat drives off the carbonic acid in the water and causes the lime to be deposited on the side of the vessel containing it. Those who live in districts where the water is hard from this cause may soften it in this way.

Boiling the water has another advantage, that of killing all micro-organisms which may have found their way into it from any source. While the danger from them may not always be present, it is sometimes, perhaps more frequently than is generally supposed, and so this precaution of cooking water is doubly useful.

Whether the water shall be taken hot or cold is also a question for consideration. In very many cases hot water is decidedly preferable. It acts as a stimulant to the stomach, bringing more blood to it and enabling it to secrete more and better gastric juice. It carries some heat into the system, and this is an advantage, for in the low physical condition of the consumptive he is not always able to generate enough heat to keep the skin and the extremities warm. It helps to equalise the circulation of the blood, often very unequally distributed. If taken when the stomach is empty, it helps to cleanse it from

undigested or badly digested food which, if not washed away, would contaminate the new food eaten. It promotes action in the kidneys, causing them to throw off a large amount of waste matter from the system, and thus relieve it of a load that helps to weigh it down. It stimulates the nervous system to normal action, an advantage not easily over-rated. It prevents taking cold by keeping up the external circulation to a high degree.

Hot water taken quickly after there has been an exposure to cold and a chilliness caused, is almost a sure preventive of injury which might otherwise result.

The amount of hot water which may be taken should not be less than half a pint, and may be two or three times as much. The degree of heat should be as high as can be borne. The way to take it is with a teaspoon, sipping it hot from the cup. If the degree of heat is not as great as can be borne the water might as well be taken cold. The time for taking it should be from half an hour to an hour before eating and before retiring for the night, at least four times a day.

Because hot water has so many advantages it does not follow that it should never be taken cold. Pure cold water may often be a tonic to

the stomach, and useful when there is a feverish condition ; but it cannot be taken in such large quantities, nor does it answer so many ends.

Alcoholic drinks, and especially wine, are often advised for the consumptive. This is particularly the case in European countries. Some physicians think at least a quart of selected wines, adapted to the patient and his condition, may be taken every day, generally in small quantities, and often so as to cause no intoxication but a constant stimulation of the heart and nervous system. I am confident that no such use of alcohol will be found necessary or desirable when hot water is employed. The hot water will fulfil all the uses expected from wine, and many more besides.

Tea and coffee are in such general use that only a word is required regarding them. Tea, if used very weak and very moderately, need cause no harm ; but the excessive use of strong tea is objectionable. The same may be said of coffee.

Chocolate, however, may be used moderately, often to advantage, providing it does not cause a dull, heavy feeling, which is sometimes the case. Then it should be avoided. Only the best kinds of chocolate should be used.

Of milk and the juices of fruits I have already spoken.

Much more might be said concerning food and drink, but I deem it unnecessary. To some extent the articles used are determined by the climate and season and the habits of the people, and they cannot always be radically changed to suit any hard and fast rule. They may, however, be changed to a considerable extent if in the direction of Nature and her laws, and at least this much should be attempted. The main point is to perfectly nourish the body as far as this is possible.

CHAPTER XVII.

PSYCHIC FORCES—THE WILL.

THOSE who have read the ponderous discussions in books concerning the will, and whether it is free or not, have no doubt felt more or less confusion of thought concerning the subject, and perhaps given up trying to master it. I shall not, I hope, confuse them more, but offer some simple thoughts on the subject which may be useful. What do we understand by the will and will power? By the will is meant that power of the human mind which decides what shall and what shall not be, and then proceeds to make the decision real, to bring to pass what has been willed, or prevent the occurring of that which has been decided shall not be. The will includes the choice or decision and the action. The choice must come first; without it there can be no act. The act, however, is as necessary as the decision. It would not be an

act of the will to decide to get up at six o'clock in the morning and then to lie abed till noon. Put the two together and we have an act of will. From this point of view all agree. Even Herbert Spencer, who does not believe in the freedom of the will, admits that the power of choice is free, and the act possible if not beyond our ability to perform.

In exercising the will, a wise choice is important. Crousaz, who wrote more than one hundred and fifty years ago, says: "Wisdom consists in never exercising the will without having first deliberated with all possible attention, in never determining ourselves but upon very clear ideas, and in never forming a resolution but upon conclusions well demonstrated on evidence only, without passion having the least share in them. This is the great end of philosophy, which the nearer we approach, the more we deserve the name of philosophers."

The amount of will power in different persons varies greatly. I do not hesitate to say that there are individuals who go through life without ever exercising the will vigorously, or on any great subject; things go along with them almost automatically. But we must not from this conclude that such persons have not the faculty;

they have it but do not use, do not cultivate, it. It is with the will as with all other faculties, it is stronger or weaker in proportion as we use it or do not use it. To exercise the will vigorously for those who hate trouble is not easy, and those who have been brought up in the lap of luxury and never required to make any vigorous exertions find it very difficult to master themselves in this matter. Often their whole lives are failures because of it.

The amount of will power in the same persons differs greatly at different times. When one is healthy and full of life and eager for activity, the will is stronger than when he is exhausted. After or during any severe illness, will power is at a low ebb; there is very little of it in some acute diseases, and in many chronic ones it is also deficient.

If it were not for will force, the work of the world, its civilisation, progress and greatness would soon come to naught; by its aid the world has become great, the civilisation, if not all we desire, is at least something of which we may be proud.

The influence of the will in preventing disease is very great. We all know the power of the imagination, on the body, and how much fear

influences it. Almost any disease can be produced by the imagination as well as cured by it. No doubt many cases of consumption are at least partly the result of fear and an active imagination on a weak body. Fear paralyses and weakens the physical nature when disease may find an easy entrance. In such cases, if the will could be exercised vigorously the malady might be made to vanish. By refusing to yield to morbid fears we rise above and superior to them and conquer many bodily infirmities.

It is the strong mind always that has been able to sustain a feeble body, not the strong body that has sustained a feeble mind. From this, it seems to me, it is evident that the mind is far more than the body.

A good story is told of the father of Thomas Carlyle. He had an iron will and a contempt for any one who said, "I can't." "Impossible" was not in his vocabulary. Once, during harvest time, he was taken seriously ill. "You cannot go to the harvest field for weeks to come," said the doctor. The next morning he crawled out among the men, as an idler among the workers. He looked at the corn ripe for the sickle, and then stamping his foot on the ground said, "I'll

gae mysel' and wark out the harvest," and he did work like a man. This may not have been wise, but it showed the power of an indomitable will.

The value of a strong, well-directed will for consumptive persons must not be overlooked. In them it is usually, but not always, weak. It ought to be cultivated, trained, made stronger. How is this to be done?

After having fixed upon that course of life which is best, it must be pursued with caution and care to the end. Instead of sitting or lying supinely on the back and waiting for something to happen, the will must be used to make that happen which ought to be. The following suggestions will serve as aids:—

1. In walking, standing or sitting maintain the upright position. Usually these exercises and this attitude are performed automatically and without conscious will power. Often they are badly, improperly done, so that the body is cramped and respiration imperfect. If the will can be used to enforce correctness of attitude and movement something will be gained.

2. In deep breathing and all those exercises for the voice and lungs, will power will enable the patient to perform them more perfectly and with greater benefit than where it is not used.

3. It will be necessary to form correct habits of eating, and especially in masticating the food well, and this will furnish a means for cultivating and strengthening the will.

4. Many obstacles will be encountered which must be overcome ; many discouragements which only a well disciplined will can master. If the will is turned on, so to say, when these difficulties arise, some, if not all, of them will disappear.

5. By a vigorous exercise of the will power at the proper time a cold can often be prevented. I have already stated that consumption usually begins with a cold. At the very initiatory moment of taking one a vigorous use of the will may prevent it.

6. The cough so wearing to the consumptive, and so hard to bear, may often be greatly modified or held in check by will power. We all know the influence of the body upon the mind ; but the influence of the mind, through the will, on the body is still greater, and may often prevent or modify the cough.

The will may be used to injure as well as to benefit. It may be used to carry out decisions that are unwise. Then it becomes a power for evil, and destroys instead of saves.

The will may be of the utmost value in breaking off bad habits and forming good ones. Indeed, I do not see how either can be done without it. The man or the woman whose life is largely governed by feeling, impulse and passion wastes an enormous amount of energy on matters of little or no account. But if by patient watchfulness over himself, and by practice in right-doing, he succeeds in regulating his expenditure of energy and forcing it into right channels, he has made an enormous gain. This, however, cannot be done by self-inspection, or by good resolutions, but only by doing as well as thinking. If it were possible to form in the mind an ideal, or what is the same thing, an absolutely correct plan for the daily life, and one could act on this plan constantly, he might in the end become a perfect human being, for he would form habits of action which would finally become instincts, or nearly so. The DOING would create habits which would be beneficial, but will force would be required until the channels for the flow of nervous force work without friction, which is not the case before they have been exercised.

The tissues and the organs of the body contract habits which, if not normal, become dis-

eases. The mucous membrane of the nose, throat and bronchial passages, after a few colds have affected them, form the habit of secreting abnormal quantities of matter which may be kept up for life. To a great extent these habits of the tissues are involuntary; but I am not sure if we knew how, we might not control them by self-suggestion and proper acts of will. Something akin to this is done by the mind cure devotees. They utterly ignore diseases, or the habits of the body and its organs, and suggest to themselves that the opposite or health is true, and often in time it becomes so. I need not here enter into a further discussion of this matter.

The will often becomes degenerate. This is best illustrated by cases of the morphine habit, or inebriety. There is certainly no true freedom of the will in such cases, for there is practically no will at all. When the moral and intellectual nature of man becomes greatly weakened by dissipation, or by disease, the will, unfortunately, degenerates at the same time. So great danger are we all in, in this respect, that it is of the utmost importance for us to guard against everything that leads to these results with all our powers.

In cultivating the will, we need the aid of good friends and helpers who will not counteract our good resolutions or drag us down, but often we cannot have such help. In this case self-reliance is absolutely essential. Without it there is not much to be hoped for or much to be gained.

CHAPTER XVIII.

OTHER PSYCHICAL FORCES.

I HAVE spoken of the use of the will ; but this is not the only psychical force needed by those for whom this book has been written.

Courage is another trait of character of the highest value. Courage causes us to resist danger and to overcome difficulties ; to fight our way to success, if need be. Courage is a sign of strength. It is strength. To stand in the face of danger and defy it is conduct worthy of the highest praise. Courage infuses into the whole system a healthy condition. It is the opposite of fear. Fear is a weakness that leads to disaster. Whoever abandons himself to the dominion of fear is lost ; but courage is a tonic that braces the whole system and holds it firm. Courage may be cultivated like all other qualities of the mind, by doing those things every day that require it, by reading those books that inculcate

it, and by associating with those persons who possess it and give it to others. One man or one woman may give courage to a thousand ; or he may spread dismay and fear to all he comes in contact with.

The invalid is too often obliged to associate with those who do not inspire him with courage, but weaken him. There are thousands who feel it their duty to carry into the sick room an atmosphere of gloom, to tell the invalid how badly he looks, or how weak he is—things he should never think of if he can avoid it. He probably knows quite enough of his weaknesses and his dangers without having them thrust at him, by those who have no sense, on every possible occasion. Homer, in his *Illiad*, describes these people when he makes Agamemnon say to Calchas :

“ Prophet of Evil ! Never yet hadst thou
A cheerful word for me. To mark the signs
Of coming mischief is thy great delight ;
Good dost thou ne’er foretell nor bring to pass.”

Courage begets self-reliance. Emerson says in his beautiful *Essay on Self-reliance* : “ If we cannot at once rise to the sanctities of obedience and faith, let us at least resist our temptations ; let

us enter into the state of war, and wake Thor and Woden, courage and constancy in our Saxon breasts." I once knew a man who said he never in all his life had known fear. He was a man of courage. In early life he was threatened with consumption, but he fought it with an iron will and lived to a good old age, and had a most useful career. To be courageous does not imply that we are to expose ourselves unnecessarily to dangers, to be reckless and foolish in regard to them. The wise man avoids unnecessary dangers. He fights those he cannot avoid. If he fails he has at least shown true manhood and set an example for imitation by others.

Crousaz says, "That we may not be without remedies for the evils to which we may be exposed, it is a wise precaution to take measures at a distance, to form schemes, and determine what we shall do in misfortune. But it would be a senseless precaution to be constantly looking for ill-fortune for fear the surprise would increase the weight of it. Such a remedy is worse than the disease. Our happiness depends on our way of thinking, and it is impossible to be happy while the mind is constantly dwelling on melancholy ideas. Of a thousand evils we fear, we rarely meet with one of them."

Fortitude is a cousin to Courage. An aneient Brahmin wrote of it : " Perils and misfortunes and want and pain and injury are more or less the certain lot of every man who cometh into the world.

" It behooveth therefore, O ehild of calamity, early to fortify thy mind with courage and patience, that thou mayest support with beeming resolution thy allotted portion of human evil.

" As the eamel beareth labour and heat and hunger and thirst, through deserts of sand, and fainteth not, so the fortitude of a man shall uphold him through all his perils.

" A noble spirit disdaineth the malice of fortune ; his greatness of soul is not to be cast down.

" He hath not suffered his happiness to depend on her smiles, and therefore with her frowns he shall not be dismayed.

" As a rock on the seashore he standeth firm, and the dashing waves disturb him not.

" He raiseth his head like a tower on a hill, and the arrows of fortune drop at his feet.

" In the instant of danger the eourage of his heart sustaineth him, and the steadiness of his mind beareth him out.

" He meeteth the evils of life as a man that

goeth forth to battle and returneth with victory in his hand.

“Under the pressure of misfortunes his calmness alleviates their weight, and his constancy shall surmount them.

“But the dastardly spirit of a timorous man betrayeth him to shame.

“By shrinking under disease he falleth to meanness, and by tamely bearing insults he inviteth injuries.

“A reed is shaken with a breath of air; so the shadows of evil maketh him tremble.

“In the hours of danger he is embarrassed and confounded; in the day of misfortune he sinketh, and despair overwhelmeth his soul.”

Hope is another psychological remedy. Its promises are sweeter than the odour of the rose, its allurements than the beauty of the most lovely flower. Often it misleads us by the brightness of its visions, the greatness of its promises, and yet without hope we could not live. It is not well to permit a vain hope to allure us, and he that is wise pursueth it not. J. Mortimer Granville says, “Whether in the case of those who while still active are believed to be affected with disease that kills, or in the case of those who lie prostrate under the crushing onslaught of acute

illness, hope is one of the most powerful restoratives."

A reasonable hope ought to animate every invalid. If they despair they can hardly recover.

As hope lifteth up, so mirthfulness lighteneth the load we carry. Solomon hath it : "A merry heart doeth good like a medicine, but a broken spirit drieth the bones," and in another place, "A merry heart maketh a cheerful countenance, but by sorrow of the heart the spirit is broken." It may be said, and truly, too, that a joyous spirit is the outward expression of health and fulness of life. Joy is the overflow of a surplus of energy, and this the consumptive has not. How, then, can he be joyous or mirthful? Perhaps he cannot in the highest sense, but he can cultivate mirth so that he will not be absolutely without it. The germs of mirth and joy exist in every heart. Even the sick and those near to death possess them. Cultivate mirth and it will yield some fruit, if it does not yield it in rich abundance.

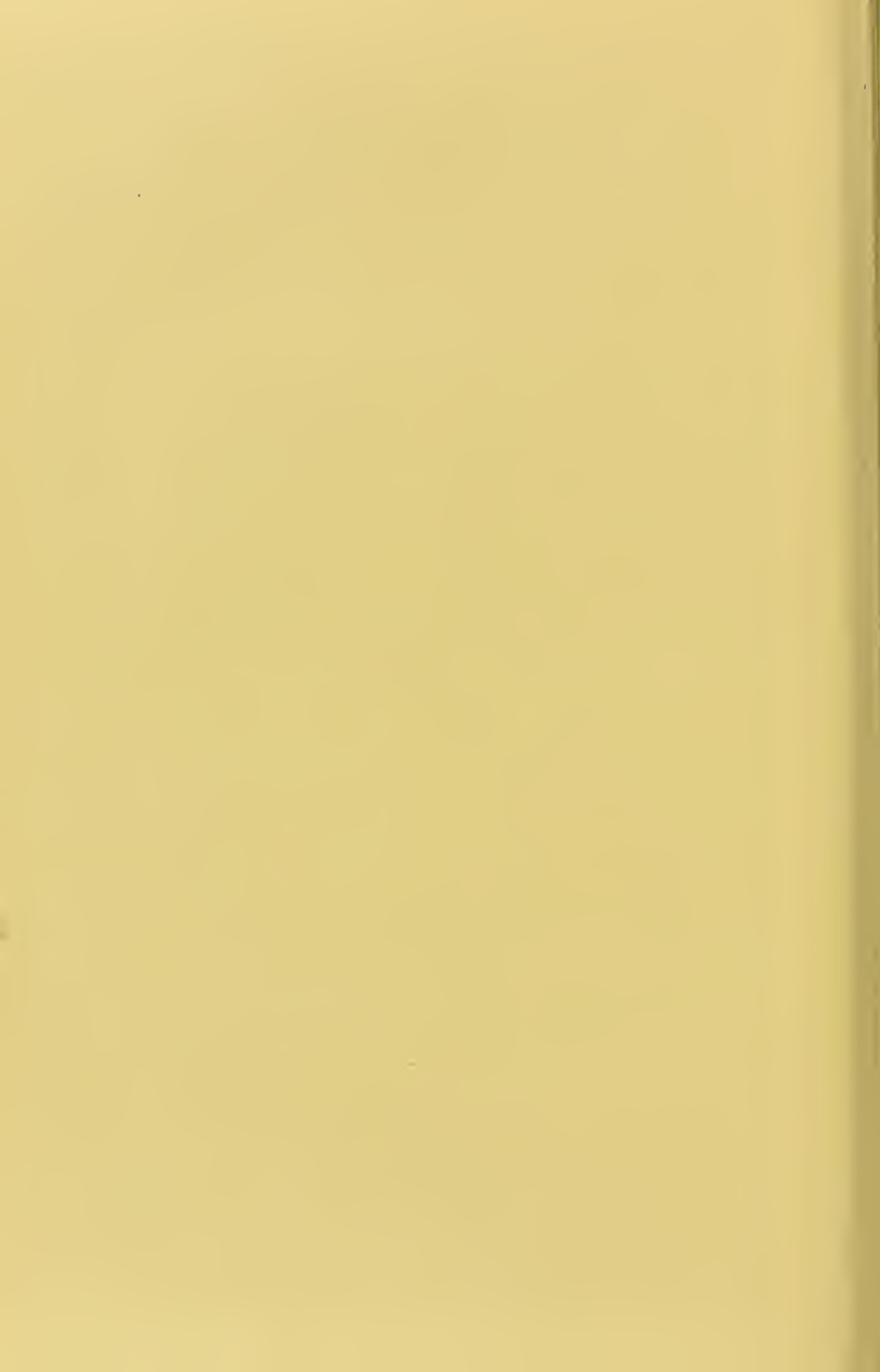
It may be said that all this is true of patients with any disease, or with those who are not ill, and this is so. But there are psychological states peculiar to consumptives. They have usually

lovable natures, are kind and amiable towards others, grateful for the smallest favours shown to them, and far more sanguine in their natures than their condition warrants them in being. I sometimes think that they have an excess of hopefulness which lures them to destruction. But these beautiful qualities of mind and heart are many times offset by perversity of thought and action difficult to explain. They are generally too sensitive both to praise and censure; often irritable beyond measure, emotional, given to storms of feeling, apathetic, capricious, and considering their intelligence and culture (for consumption is a disease of civilisation and of the cultivated classes) too easily disturbed by the manner in which they are esteemed. Often they waste their strength and weaken themselves by the excess of their emotions.

In all these particulars their psychical natures need remodelling, or making over. They need educational treatment. How are they to receive it? If they could be treated in suitable institutions by physicians capable of ministering to the mind as well as the body much could be done; but unfortunately, except in a few cases, this cannot be done, so they must in a certain degree depend on themselves, upon such friends

as are helpful, upon books which call them up to their best, and upon such cultivation of their moral and religious nature as they are able to receive.

I look forward to the future with great hope that in some adequate degree the psychical treatment of the consumptive and, indeed, those with many other diseases shall receive due attention. It may be a long time, but it will surely come. The age demands it. We are gradually outgrowing the use of drugs and poisonous medicines, and placing more reliance on Hygiene. When that day comes the ravages of disease will grow less and less, and, we may fondly hope, almost entirely disappear from the earth.



PART III.

TREATMENT IN MORE ADVANCED
CASES.



CHAPTER I.

OPEN AIR, REST, AND LIGHT CURE.

THERE are, unfortunately, a large class of patients whose disease has progressed so far that they are unable to bear the treatment suggested in previous chapters. Their lungs are already seriously affected ; they cough much ; have fever during a portion of each day, perhaps sweating at night, and other unfavourable symptoms too numerous to mention. These persons are not able to ride on horseback, to take active gymnastic training or baths. What can be done for them? Must we abandon them to their fate? No. So long as there is life we must give them the benefit of all favourable conditions.

They are most benefitted by continued dwelling in the light and air. If they could be sent to suitable institutions, many of them could perhaps be restored to very good health ; but

institutions suited to such patients are not common, and so we must consider other methods, adapted to home treatment, until we can do better. The patient, aided by friends, must inform himself, must do much for himself, must not only co-operate with his medical adviser, but do more for himself than his medical adviser can do. The latter can, if he has been educated in hygiene, guide, encourage, admonish, and this is much; but the patient must, after all, do more than these; he must work steadily for an end, and do his best to give nature a chance to make the cure.

For such cases, the open air and light cure has many advantages. The method is, in the main, as follows:—The patient spends a very considerable part of the day lying in a comfortable reclining chair, in a tent set up in a suitable place, protected, of course, from wind and rain. During the milder portion of the year this is easily managed. In the country many homes have some place protected from wind and suitably shaded to answer the purposes, as a wide verandah, or a small house raised from the ground and made so that it can be opened on all sides at pleasure, may be erected for the purpose. At first, the light must not

be too strong, for it is a powerful stimulant to the nervous system, and may act on the patient, while in his enfeebled condition, beyond what will prove beneficial. The patient is to be well protected from cold, moisture and drafts of air by suitable screens and clothing. He may lie in his cot, which should be on wheels so as to be readily changed in position, for six, eight, ten or twelve hours a day, beginning, of course, with less, and gradually increasing the length of time as he becomes accustomed to and can bear it. By suitable arrangements this out-door life may be kept up the whole year, and in almost all weathers. Of course in the cold season a verandah well protected could be used. When the temperature is low still more clothing will be required, and only the nose for breathing and the eyes for seeing need be much exposed. The advantages of this treatment, if properly carried out, are as follow :—

The patient breathes all the time the out-of-door air, not stale air which has been polluted or spoiled by the house. We cannot over estimate this advantage. Of course we all know that air may kill as well as cure ; but this is when it chills us, or when we are in a draft, or when it is loaded with impurities

and poisons. In its use we take it for granted that there is to be no chilling of the limbs or skin. The loss of bodily heat is less than when the patient is walking around with limbs only protected by ordinary clothing. There is in this position little waste of the forces of the body. They are conserved for building up the system.

Inhaling the out-of-door fresh air is very different from inhaling that in a house, even though the temperature of the latter is the same. It is not mixed with the products of whatever is produced within. Few realise how great the difference is, even in a sanitary house. We breathe more freely out-of-doors, take in more air, and this is of the greatest importance to the invalid.

The effects of lying protected in the light and air, continued for weeks and months if need be, are to diminish the fever, to moderate the coughing, to improve the appetite and digestion, and, of course, to increase the strength.

Dr. Dettweiler, director of the Institution for Consumptives at Falkenstein, Germany, has probably had a larger experience in this method of treatment than any other physician, and has reduced it to a system. He says: "I

know by careful study and observation its excellent results. It protects the patient from dangers to which he would otherwise be exposed, such as perspiration, chills, over exertion."

The same author continues: "I have in my possession tables of several winters which speak most favourably of my experience with the air-rest cure (*Luft-Ruhecur*). In spite of rain, fog and days without sun, wind and snow, the latter sometimes blowing all about the chairs in which the patient reclines, and often with a temperature of 12° below freezing point, my patients, with the exception of a few, have spent from seven to eleven hours daily in the manner described. The day begins after breakfast and does not end till ten o'clock in the evening. During all this time the sleeping-room of the patients are kept open so as to permit of the fresh air passing in and out. Even at night the bedroom windows are not entirely closed. The difference between the summer and winter exposure to the air in the manner described is hardly one-half of one per cent. of the amount of time given to it."

The results, however, secured by Dr. Dettweiler with his treatment are most flattering, for the absolute and relative cures amount to at least

twenty-five per cent.—a proportion far greater than by the treatment to which a very large majority of consumptives are subjected.

There is one effect of this out-of-door treatment which must not be forgotten. It is the psychical effect. Continual dwelling in a house and in a room very soon produces a morbid state of mind exceedingly distressing and hard to bear. This is almost entirely done away with by the method proposed. To be out of doors is to be amidst life, motion, change of scene. It gives diversity, interest, amusement. The patient sees more or less of nature, and if he is one of her lovers, takes an interest in her.

Dr. Nicaise gives a very brief picture of Dr. Dettweiler's Institution and the life there. "The establishment of Falkenstein is situated in the Taurus Mountains, about one hour's journey from Frankfort-on-the-Main, at an altitude of nearly 1,500 feet, in the neighbourhood of forests formed mainly of beech, chestnut, and oak trees. The main building is in the form of a horseshoe, facing the south, in front of which is a terrace form where one has an extended and pleasant view.

"All along the front of the building is a large tent under which the patients rest in their long

reclining chairs. Most of the rooms open into a verandah or gallery where the patients can also congregate.

“On the ground floor are rooms where the patients take rubbings when necessary, and also rooms for hydrotherapeutic treatment, or such baths as are required.

“The dining-room is very large, independent of the others, and so well ventilated that over a hundred patients may remain without vitiating the air.

“The food plays a very important part of the treatment, and the department for its preparation is exceedingly well organised. A dairy with twelve healthy well-fed cows furnishes excellent milk, so important an agent in the cure.

“The terrace not being large enough to contain all the patients, another collection of tents in circular form has been erected in the garden, and near the forest, where patients lie in their reclining chairs in the same manner. Curtains protect them from the wind when this becomes necessary.”

The physicians and assistants dwell largely with the patients, see them perhaps several times a day, watch closely every change for better or worse, encourage, admonish, instruct, and, in

many cases, cure. Dr. Dettweiler is impressed with the thought that the physician who sees a consumptive patient only once in, perhaps, several days, as is the case in a large majority of instances, cannot be of that service to him which is desirable. This almost constant intercourse with the patients is more for psychical influence than for the purpose of watching symptoms and the course of the disease. By it courage, hope, and determination are kept in a higher state of activity.

Says Dr. Dettweiler: "If one undertakes in an institution the treatment of such patients (those far advanced with the disease) their psychical education must be one of the first and chief measures undertaken. It stands in relation to the psychical treatment as of the *highest importance*. The well-known disposition of the consumptive, his false valuation of his condition, his want of steadiness and striving for a purpose, his constant deviation from the right course of living, must be taken into account. He must be made to understand his condition and the sacrifices he will be required to make. The nervous shock which this truth brings may for the moment overcome his hopes of recovery; but if carefully done, his understanding will be

awakened, and also his willingness to co-operate with the physician as helpers in all that needs to be done for him.

“A great number of physicians, and also of the laity, are of the opinion that the word ‘consumption’ should never be mentioned in the presence of the patient. I regard this method of hushing up and cloaking the subject as one of the chief reasons why the disease goes on to an incurable stage.

“I have in my own experience, in hundreds of cases, never known injury, but only good to come from this knowledge, and never omit it except in the case of effeminate persons and those of weak characters.”

I have given this brief sketch of the method pursued at Falkenstein, so far as it relates to the out-door treatment, because I think many of its advantages can be secured by patients who are not able to go to institutions, in their own homes. The intelligent American is one of the most practical of persons, and often knows how to adapt means to ends, even under very unfavourable conditions. I would like to see every home where there is a consumptive, so far as can be, made into an institution where the

patient and every member of the family will be intelligibly interested in carrying out the hygienic treatment required, instead of hindering, as is too often the case.

CHAPTER II.

ENLARGING THE CHEST.

I HAVE already, in other parts of this work, spoken of the necessity of enlarging the lungs and chest, and in later stages of the disease this must be attended to so far as is possible. The patient may not be able to take active gymnastic training or vocal gymnastics, but he can take passive exercises, often with great benefit, especially if only one lung is involved and not a large portion of the other. He can maintain such a position of the body that the respiration shall not be cramped, but free. He can, in most cases, take gentle, deep-breathing exercises, even while lying in bed, resting between each exercise so as not to over-do or excite unduly the lungs. The chest can be stretched and expanded without relation to the breathing, so as to enlarge its cavity and give a more free play to all its parts.

This stretching of the chest can be done a

dozen or more times a day, either standing, sitting or lying down, according to the strength, and done in a dozen different ways. One of the very best of these movements is found in Prof. Emerson's book on physical culture. The patient stands upright, head well thrown back, and the tips of the fingers raised so as to rest lightly on the front of the chest. Now raise and lower the front of the chest, first as high as can be done and then as low as possible, stretching it all the time as much as it will bear, both laterally and sidewise. This is to correct the cramped state of most persons' chests, caused by sitting at desks, or in chairs not properly constructed.

Another exercise is to stand on the right foot, place the left foot out at one side about twenty inches, letting the toe touch the floor; now raise the arm sidewise, so it shall be about in a line with the left leg, and then keeping the body and limbs in line, try to stretch the raised arm outward and upward as far as can be done, without falling, while four or eight is counted; rest a little and repeat with the other side.

The exercises should also be done by stepping diagonally forward, raising the arm on the same side, in a line with the forward step, so it shall be at an easy altitude, and reaching forward and

upward as far as can be done. Repeat with the other foot forward. It may also be repeated in another way: Step diagonally backward, raising the arm so as to be in a line with the forward foot. The first of these exercises is, however, the best. They should be done with care and gently at first, so as not to produce dizziness. After a little practice, do this more thoroughly, by stretching the extended arm further up. The effect is to elevate the shoulders and promote natural respiration.

In addition to what has already been said, the patient can use the sun bath, as before advised, of course using great care. It is better to accustom one's self to the light very gradually rather than suddenly. Perhaps in some cases taking the bath clothed, or only on portions of the body at a time, would be preferable.

Gentle rubbing and what is called magnetic treatment has its value, if taken once or twice a week, provided a healthy person gives it, but if not, omit it. The oil bath may be taken in its place. Remember that anything that exhausts the patient is not beneficial.

The food is equally important in the later stages of consumption. The plan should be to

use the best, so as to nourish the body as perfectly as can be done.

Regarding fatty food, I perhaps ought to add and emphasise the importance of the use of as much as can be borne. A medical friend of mine urges that the consumptive is benefited by a larger allowance of fat than is required in health, and he believes that 100 grammes daily may, in most cases, be consumed to advantage. He advises vegetable oils, and among the best, pure olive oils; but as to this, it were better to leave the patient at liberty to consult his own wishes and likes. He may choose olive oil, cream, butter, or other fatty substance that is most agreeable. We must always bear in mind that the psychological state of a patient must be considered, and his peculiarities taken into account, so far as this can be done without harm.

CHAPTER III.

SELF-HELP.

PEOPLE differ in their power to help themselves. As a rule, those who are intelligent, who have rational views of life, and especially of hygiene, whose brains are well trained, are more self-helpful than those who have been dandled in the lap of luxury. The former often recover when the latter do not. This has been forcibly brought home to me on many occasions, and especially while writing the last few pages of this work, by a conversation with a gentleman who seemed to be the very picture of health. When he informed me that ten years ago he had been given up to die of consumption by a council of five physicians, some of whom had a national fame, I became interested to know the means used to escape this fate. He had simply taken matters into his own hands,

had become self-helpful. So long as the doctors hovered over him, advising him to prepare for his fate they prevented all effort of his will, and kept him in a negative condition fatal to recovery. He felt that the time had come to master the situation for himself by a heroic effort of the will. He had youth on his side, had a supreme object in life which was dear to him, and felt as if it would be a sin to die with his work half done. He determined to make a brave, courageous fight for life. He gave his mind to it, and depended no longer on doctors who admitted they had no power to aid, but called to his help nature and nature's God. Inspired by the idea that he must help himself, he began to feel new life coursing in his veins. Lying on his bed, he began to attend to the proper position for breathing, and to take as much air into his lungs at every breath as he could without over-straining. He attended to the purity of the air, so as not to breathe over and over again that which had been devitalised. He began to call into use the weakened muscles of the chest, abdomen and back by gently stretching them, making them tense and then relaxing them and resting as long as his judgment decided

was best. Whenever the sunshine came into his room he got into it and was warmed and vitalised, as he expressed himself, by it. He gave up tea, coffee, and all flesh food, using eggs, oysters, milk, good bread, and such other things as seemed best, with pure, soft water as hot as he could take it. He decided that it was his duty to be cheerful and happy, even when facing danger, and to enjoy life in a reasonable manner. With all these tonics he began to mend and the night sweats ceased, the cough and expectoration lessened, the afternoon fever gradually disappeared, and his strength increased. As soon as possible he sought a healthful climate, lived out-of-doors, and constantly grew stronger and stronger, till he felt that he had recovered. To-day he is a well man.

Visiting his old home after recovery, he called on some of his doctors and surprised them by his appearance in robust health, told them his story and received much praise for what he had done.

This is a typical case, but there are and have been many such, varying, of course, according to circumstances and conditions. Each patient works out his own salvation in the way most

suited to his needs, often feeling his way along, groping in the dark, and, no doubt, guided by a supreme power which it is said helps those who help themselves. This is self-help, and I wish to emphasise its importance.

CHAPTER IV.

DIFFICULTIES IN THE WAY—CAUTIONS.

THAT there are many difficulties in the way of a final cure of consumption no one pretends to deny. Some of these difficulties may be mentioned. One is the delay in attending to the disease until it has progressed so far as to be incurable. This tendency of human nature to put off proper treatment of diseases of all kinds until they are far advanced has shortened many lives. Why is this? No doubt it is partly due, in cases of consumption, to its very insidious nature. It steals into the system little by little, and often so slow is its progress at first that even the physician may be in doubt regarding it. This is the time it is most amenable to treatment.

Another difficulty is the ignorance in which a majority of people dwell regarding hygiene

and the laws of health. Education in this respect, both public and private, has not kept pace with education in other matters, but lagged behind at a slow pace. Men and women highly accomplished in science, art, literature and other departments of learning know little as to how they should conduct their lives so as to maintain a high degree of health for as long a period as is consistent with the laws of their being. As the great philosopher of this century, Herbert Spencer, has said, "Not what knowledge is of most real worth is the consideration, but what will bring most applause, honour, respect, what will most conduce to social position and influence, what will be most imposing" is acquired. There are signs, however, that we are soon to emerge from this barbarism of the past, and that in no distant time a very different idea of education will prevail, and we shall then try to acquire that knowledge which will promote in the highest degree true living, first physical, as a foundation on which to build, and after that, intellectual, moral, and spiritual development.

Another difficulty is the load of care and work that too often rests on the patient. There is no time to stop and give attention to the body and its needs, or at least this seems to be the case ;

but a little reflection will show that this is an error : so much more labour can be performed when the body is properly cared for that this excuse ought to have little force.

Poverty is another obstacle, and a very real one ; but even this can in many cases be overcome, especially when the method of cure is one which depends on the patient and his intelligence and willingness to do for himself, and does not require medicine or great expense. It is the intelligence and the well-directed effort that is most needed, and these can be acquired. Where there is a well-directed will there will be a way.

A few cautions may be needed by some who read this work.

The most important is to avoid effort of any kind that produces exhaustion ; keep within the bodily resources. If there is little strength, use it for the wisest purposes, which generally will be in digesting good food, and little by little enlarging the chest, so as to increase the breathing capacity.

If there be much nervousness and excitement, causing exhaustion and unrest, then their causes must be avoided. The most soothing remedies are air and light ; but even these may cause

a reaction if used unwisely before the body has become accustomed to them. The psychical influence of trees, plants, and animals is sometimes wonderful, and a love for and acquaintance with them should be cultivated. There often grows up a sort of friendship between a lover of nature and the trees of the forest or field which produces a very harmonising effect on the nervous system. So when there is excitement of the nervous system, use these remedies for all they are worth.

Care must be used to prevent the injury which may arise from crowded assemblies, and this will make it necessary to avoid parties and gatherings of people of every kind in crowded rooms, such as theatres, concerts, lectures, and even churches. Forego them all rather than jeopardise life and health for them. Much more might be said on this point, but I deem it unnecessary.

CONCLUSION.

In conclusion, let me say that this work has been in preparation for many years. My attention was first called to the necessity for it by my own personal experience and needs, and after

that the needs of others. That it has many imperfections no one can know better than the author ; yet with all its faults he feels convinced that it will prove useful to many, and with this feeling he gives it to the world.

THE END.

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